

d/p-PRO™

FALL 2020 • VOLUME 11 • NUMBER 3

Saving Lives Through Education

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DAMAGE
Prevention Week™
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**DAMAGE
PREVENTION
WEEK**
MARCH 22-28
SEE PAGE 30!

PRIVATE UTILITY LOCATING & CROSS BORE **RISKS**

ISSUE SPOTLIGHT:

- // Reducing Utility Damage During Construction
- // Introduction to GIS

PLUS:

COVID-19
and Damage Prevention •

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By Tom Hall

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FROM THE
PUBLISHER



BY SCOTT LANDES

Focusing on a Safe and Healthy Learning Environment

As I alluded in my column last issue, Infrastructure Resources, in its mission to save lives through education, is hard at work finding new ways to bring continuous access to education, networking and resources to the damage prevention and excavation safety communities in North America and around the world.

When COVID-19 first began to invade our collective consciousness, no one believed, more than six months later, that we would still be battling this pandemic. But... here we are, and here it is. We have every confidence that we will have overcome the pandemic by March, but we also need to make sure that our Global Excavation Safety Conference is a safe and healthy environment for you. Some of the protective measures we are implementing include:

- Self-registration to reduce face-to-face interactions
- Social distancing in queues and lines
- Hands-free badge access to rooms and meals
- Wider exhibit hall aisles
- Seating capacities to accommodate social distancing requirements
- Hand sanitizer stations
- One-way ingress, egress and travel paths
- Thermal screenings and appropriate PPE
- Food served in closed containers with wrapped utensils

OUR PARTNERS HAVE ALSO IMPLEMENTED STRICT PROTOCOLS TO ENSURE YOUR SAFETY:

Tampa Convention Center

- Public touch points cleaned hourly
- Hotels:**
- More frequent and deeper cleaning
- Regularly disinfecting high-touch areas
- Contactless check-in
- Sanitizing wipes in all guest rooms
- Grab and Go food items
- Removal of non-essential high-touch items

In addition, our NO-RISK cancellation policy makes it much easier for you to decide to return to live events in March. See our policy at GlobalExcavationSafetyConference.com.

Of course, regardless of our confidence, or the protections we have put in place, some will naturally still feel uncomfortable gathering in large groups; or may be under company travel restrictions that takes the choice out of their hands.

It is important to us that everyone has access to the important industry resources you have come to expect from the Global Excavation Safety Conference, so in addition to our scheduled live event March 23-25, we are offering a VIRTUAL Global Excavation Safety Conference April 4-6, 2021. While a live event offers key opportunities that cannot be duplicated, our virtual event promises a robust collection of education, access to the important product and service providers you need to connect with and, YES, even great networking opportunities!

The virtual event is not simply a recorded repeat of the live event, nor is it only a series of viewable webinars. Our Virtual Conference is a truly interactive experience that will allow you to increase your knowledge and enhance your circle of colleagues all from the safety and comfort of your desktop. Learn more about the virtual event on page 11.

From all of us here at Infrastructure Resources, we hope you remain safe and healthy and look forward to seeing you – whether in-person or virtually – next spring at the Global Excavation Safety Conference. DP



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• STAFF REPORT •

Dominic Puiu

A Name Synonymous with Dial Before You Dig

“TENACIOUS. INTELLIGENT. PASSIONATE. HARDWORKING. MOTIVATED. THAT’S DOMINIC PUIU,” SAYS PAUL NEWMAN, GENERAL MANAGER OF DIAL BEFORE YOU DIG QUEENSLAND. IF THERE IS A SINGLE THROUGHLINE TO BE FOUND IN A CAREER AS MULTIDIMENSIONAL AS DOMINIC PUIU’S HAS BEEN, IT IS PASSION. THAT PASSION HAS DRIVEN DOMINIC TO CHANGE THE LANDSCAPE OF DAMAGE PREVENTION EDUCATION ACROSS NEW SOUTH WALES AND ALL OF AUSTRALIA.

Dominic has served as the Manager of Dial Before You Dig New South Wales/ACT for over 21 years, spreading the safe digging message and providing services for member organizations. Before that, he served as the Marketing Officer since the inception of the service in 1996.

When Dominic started as Manager of CBYD NSW/ACT in 1999, there were only a handful of One Call memberships. Today, CBYD NSW/ACT has grown to a whopping 145-plus member organizations, thanks in large part to Dominic’s drive, persistence, and willingness to learn and innovate.

Throughout his long career with CBYD NSW/ACT, Dominic has brought new outreach ideas to the table in pursuit of spreading the damage prevention message throughout Australia’s most populated state. He has spearheaded sponsorships of surfboats that compete

across the nation, sponsored several motor racing categories, and supported local charities. “He is always looking at new, out-of-the-box ways to promote safe excavation,” says Scott Landes, President of Infrastructure Resources, who works closely with DBYD in the production of the Oceania Damage Prevention Conference.

Most recently, Dominic has shown his ability to grow as he’s taken the Call Before You Dig message to social media. “He has taken to social media campaigning like a duck to water,” Newman says. “Dominic recognizes the great potential in reaching large demographic audiences via social media and continually posts newsworthy content.”

One of Dominic’s greatest impacts in the industry came in 2010 when the New South Wales government



legislated the Dial Before You Dig One Call law. NSW was the first jurisdiction in Australia to do so and Dominic was instrumental in the process.

Dominic has also reached beyond Australia’s coasts to learn and spread the damage prevention message. He is an active member of The International One Call Panel, speaker at the Excavation Safety Conference, and regular contributor to *dp-PRO* magazine.

Outside his Dial Before You Dig work, Dominic serves as Chairman of the Streets Opening Coordination Council, a voluntary association of member organizations that endeavor to resolve issues cooperatively in respect to services in the community. Dominic has brought invaluable knowledge of underground utilities to an association with over 100 years of history.

Viewing Dominic Puiu and Dial Before You Dig separately is a near impossible task. After more than 20 years of mutual growth, they are intertwined. Otre Moussa, a DBYD coworker and Director of Otre Engineering P/L agrees, “The entire industry associates DBYD with Dominic Puiu. No matter where you go or who you talk to, everyone acknowledges that the success of the One Call service in NSW/ACT is because of Dominic’s hard work and constant promotion of the service. Hopefully, he will be around for another 21 years!”

Dominic’s passion for delivering the damage prevention message has improved the safety and quality of countless lives. That makes Dominic a true Damage Prevention Hero! **DP**

“The entire industry associates DBYD with Dominic Puiu. No matter where you go or who you talk to, everyone acknowledges that the success of the One Call service in NSW/ACT is because of Dominic’s hard work and constant promotion of the service.”



Larry Wilkin:

Animal lover, Damage Prevention Specialist and Volunteer of the Year

• BY DAVE RAU •

PROTECTING COMMUNITIES by promoting safe digging is not enough for Larry Wilkin of Columbia Gas of Ohio. He is also a dedicated community volunteer in his spare time. That is why the company named him its “Volunteer of the Year.”

A Damage Prevention Specialist, Larry is based in and around the Zanesville, Ohio area. His love and compassion for animals and dedication to his community made him an easy choice for the award.

Larry and his wife, Barb, volunteer every Sunday at the Coshocton County Humane Society in Coshocton, Ohio, where they help care for cats and dogs waiting to be adopted into their forever homes. Larry helps feed the animals, gives them their medications, cleans out their cages and provides some much-needed love and affection. Larry and Barb also support the Humane Society’s fundraisers and special events which help raise money for the supplies needed to care for the animals.

“Larry has saved me multiple times with fundraising efforts,” said Rachael Selders, Coshocton County Humane Society Chair. “He has a natural gift to connect with people and is outspoken, which helps get the word out. Larry is a true blessing in so many ways. Last year he put in many more hours than documented and we are so thankful for this. I know I can always count on Larry. He is a true friend.”

In addition to volunteering at the Humane Society, Larry loves to volunteer at community events that Columbia Gas of Ohio sponsors. Each year, he looks forward to seeing the smiling faces of dozens of kids that attend the Fire Safety Days in Newark and Zanesville, Ohio. And, Larry is also the former chief of a volunteer fire department.

“I think it’s great because I’m working in the Muskingum Valley area and my hometown of Coshocton,” Larry said. “I really love the area and it lets people know that Columbia Gas gives back to the community.”

Larry builds relationships with contractors and municipalities on the job to promote safe digging. If there is a problem or question about locating gas lines, they know Larry will get things taken care of.

“Larry is a good guy,” said Dan Creekmur, former President and Chief Operating Officer of Columbia Gas of Ohio. “Simply put, he’s one of the first volunteers. He genuinely cares about our company. You can see it in his work. His role is to make sure we keep it as safe as possible.”



Left image: (L-R) Dan Creekmur, Rachael Selders, Barb Wilkin, Larry Wilkin. Right image: Larry Wilkin receives a check for the Coshocton County Humane Society from Dan Creekmur, then-President and Chief Operating Officer of Columbia Gas of Ohio (photo credit: Chris Cook, Zanesville Times Recorder. Photos taken in February, prior to COVID-19 mask regulations.)

Because of Larry’s Volunteer of the Year award, the Coshocton County Humane Society received a \$5,000 donation from Columbia Gas.

The Volunteer of the Year award is part of Columbia Gas of Ohio’s Columbia Cares program, which encourages employees to volunteer in their community to help make a difference and improve the quality of life for families, friends and neighbors. Each year, Columbia Gas of Ohio donates \$1.25 million to non-profits and other organizations. More information about Columbia Cares can be found at columbiagasohio.com/columbia-cares. **DP**

GPR Consortium: A Trade Association for GPR Professionals

• FORREST SIM •

A KEY COMPONENT to any safe excavation is knowing what lies below. This involves many steps, one of which is an investigation utilizing various non-destructive tools. Among those tools, ground penetrating radar (GPR) is unique in its versatility, challenges, training requirements, and future capabilities. It follows, therefore, that an association of GPR professionals should be similarly unique.

Mission

The GPR Consortium provides space and infrastructure for practitioners of GPR to collaborate and network. Though not a scientific research institution, the GPR Consortium does propagate the practical applications of research in the field of GPR. We care about the reputation and the future of the GPR industry, so we focus less on our members' differences and more on how we can form best practices, interpret data more consistently, educate on the capabilities of GPR, and create realistic expectations for its use.

Vision

The GPR Consortium is expected to become a major thought leader with members increasing in competence and improving the reputation of GPR as a viable means of non-destructive testing. In turn, members will bring more value to the private companies, universities, and other organizations they represent. Symposia, conferences, congresses, and similar in-person events will be part of the natural development of our desire to progress professionally.

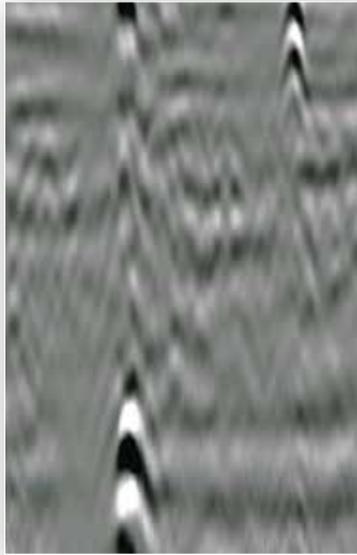
Website

GPR-Consortium.com is a purpose-built website designed to give practical knowledge, help, and support to the GPR professional with boots on the ground. Through collaboration, we can uplift and sustain each other as we work toward increased profitability and value for our various organizations and a greater acceptance of GPR technology.

The following are a few aspects of this new website. Visit us online to learn more.

• FORUM

- o GPR veterans can collaborate on complicated issues with peers from around the world, discussing how to apply new technologies and refine old methodologies
- o New practitioners can benefit from the wealth of information that more experienced users have gained, thus advancing the rate of proficiency within the industry



- o GPR business owners can collaborate with peers worldwide on the unique challenges inherent in running a business in this industry
- o Constant growth and change with fresh content

• LEARNING CENTER

- o Wiki format containing videos, articles, and pictures supplied by professionals within, and ancillary to, the GPR industry
- o After a member reads an article or watches a video from the Learning Center, he should be able to speak intelligibly, if not deeply, on that topic. He will know some common concerns, some common non-concerns, some common verbiage, etc. With few exceptions, this content will be able to be consumed in 5-10 minutes.

• CLASSIFIEDS

- o Buy or sell used equipment with no additional listing fees (beyond membership)
- o Companies needing to fill a GPR position can, with no additional listing fees (beyond membership), advertise employment openings directly to their target audience

More Than GPR

While GPR is a common thread for all members of the GPR Consortium, it is by no means the only topic of interest to our membership. Other topics in the Forum, Learning Center, and Classifieds include pipe locating wands, push-cameras, video pipe inspection, structural engineering, best practices for markings in the field, post-tension/pre-tension/rebar/wire-mesh discussions, geotechnical engineering, GPS receivers, RTK GPS, LiDAR, land surveying, geophysics, hydro excavation, ruggedized tablets and other electronics, acoustic water line locating, geology, sonar locating, etc.

Join Us

Members include concrete scanners, utility locators, geologists, geophysicists, engineers, archaeologists, students, and soon, you. As a Consortium, we are very excited for the upcoming GPR Congress, held in conjunction with the Global Excavation Safety Conference, March 22-23, 2021 in Tampa, Florida. Many of the topics discussed there will be extensions of the discussions we have on the Forum. We hope to see you online and at the Congress! Register at GlobalExcavationSafetyConference.com/GPRcongress. 

Forrest Sim is the founder of the GPR Consortium and owner of Enhanced Scanning, a utility locating, concrete scanning, and GPR investigation firm. He can be reached at forrest@gpr-consortium.com.



Finding the RIGHT Virtual Event for YOU!

In today's world, more and more event providers are turning to virtual events for a very simple reason – they have no choice. These events exist for myriad reasons – it may be education, it may be connecting with colleagues, it may be reaching vendors, maybe all three or maybe other reasons.

Every virtual event offers two big value propositions – You can attend from anywhere there is internet access, and you save money on travel and lodging, potentially allowing more members of your team to participate.

Not all events, however, are created equal. With the dozens of event invitations showing up in your inbox, how do you decide which one is right for you? Here's a few tips:

Education

Are the sessions offered specific to the knowledge you need? Will they translate to knowledge that will help you do your job better or effect change at work? Do they provide opportunities to expand your knowledge base? Are the offerings broad enough to provide exposure to a multitude of topics? Is live Q&A available on the sessions? Is there extended access time to view recorded sessions post-event?

Exhibitors

Just because you aren't face-to-face doesn't mean you shouldn't expect the same level of access to the vendors you need to reach. Do the exhibitors offer the products or services you need? Can you chat with them in real time? Is there dedicated time to visit exhibitor booths? Do the exhibitor booths include downloads, product sheets or access to videos? Is it easy to see who the exhibitors are and to navigate the expo hall?

Networking

Are there scheduled networking opportunities? Are there a variety of networking topics covering the fun to the fundamental? Are you able to select the networking opportunities you want to

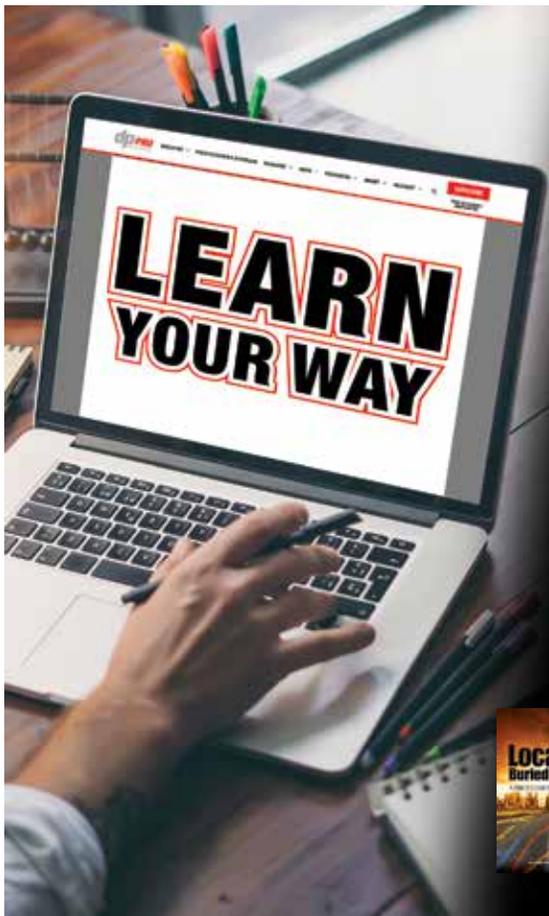
participate in? Can you chat with other delegates during presentations to share insights and observations?

Investing a little time in exploring the deliverables of the virtual events you are interested in helps to ensure you will attend events that are exactly right for you. **DP**

World-Class Education on Your Desktop: Global Excavation Safety Conference Virtual

The Excavation Safety Conference has been providing critical education to the damage prevention industry since 2004. In 2021, an entire program is now available virtually for stakeholders who are not able to travel. The virtual event is not simply a repeat of the live event but, rather, offers its own diverse selection of education, access to the important product and service providers you need to connect with and unique networking opportunities. We deliver all the important elements YOU need in a virtual event.

Visit GlobalExcavationSafetyConference.com for more information.



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LOCATING BURIED UTILITIES: A PROFESSIONAL APPROACH
A textbook covering key topics and issues within the field of underground utility locating.



Field Guides (and associated videos) covering a variety of locating topics and damage investigation.



NEWS

AMAZING FIRE Erupts Along Pipeline in Egypt

An inferno erupted along a highway in Egypt in July, with at least a dozen people hospitalized for burns and smoke inhalation from the blaze. The fire started when sparks from a car ignited oil that had leaked from a roadside pipeline. Officials said the oil leaked from the Shuqair-Mostorod pipeline onto a heavily trafficked highway running between Cairo and the Suez Canal.



Public Utilities Commission Issues WARNING

(Nevada Appeal Capitol Bureau) – The Public Utilities Commission (PUC) issued a warning in June that there have been several incidents in the first half of 2020 involving solar contractors damaging natural gas pipelines when installing electrical grounding rods. A PUC spokesperson said the contractors did not call 811 to have utility officials mark the location of gas lines before installing the grounding rods.



PUC officials said there was an incident in California last year in which a solar contractor damaged a gas line, causing a leak that resulted in a home explosion and a fatality.

The PUC issued more than 25 civil penalties in 2019 to excavators and operators for violations, and they urge people to call 811 before digging!

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OHIO OIL & GAS INDUSTRY AWARDS 54 SCHOLARSHIPS

The Ohio Oil and Gas Energy Education Program (OOGEEP) announced in May the awarding of \$54,000 in scholarships to 54 students, representing 30 counties across the state, attending 20 colleges and majoring in more than a dozen energy-related fields of study.

"It's encouraging to see so many talented young people excited to work in the energy industry," said Greg Mason, OOGEEP's interim executive director. "These students are our future leaders, and we are eager to see the innovative solutions and new perspectives they bring."

OOGEEP's scholarships are awarded to Ohio residents or students enrolled in a college or technical college program within the state. Recipients maintain an above-average GPA, are actively involved in school and the community, and plan to pursue a career in the natural gas and oil industry.

Each \$1,000 scholarship renews annually over a four-year period. Since its inception in 2007, the OOGEEP scholarship program has provided more than 500 scholarships.

Louisiana 811 Names Brent Saltzman Executive Director

The Louisiana 811 Board of Directors announced the selection of Brent Saltzman as Executive Director. Saltzman previously held the position of Manager-Damage Prevention at LA 811 since 2013. In his role as Manager-Damage Prevention, he was responsible for providing presentations regarding LA 811's operations, the Louisiana Underground Utilities & Facilities Damage Prevention Law (Dig Law), and safe digging practices.

Prior to joining Louisiana 811, Saltzman worked at Allen Construction Company as Construction Manager/Public Relations and at East Ascension Telephone Company as the Business Manager and Outside Plant Engineering Supervisor. He has served on many boards, including the Louisiana 811 Board of Directors, Association of Louisiana Utility Councils and the Capital Area Utility Risk Partnership.

MnDOT Warns about Political Signs

It's election season, and many people show support for their favorite candidates by putting a political sign in their yard. The Minnesota Department of Transportation (MnDOT) say political signs are ok, as long as they are not on the highway right-of-way.



MnDOT says employees will take down any private signs located on the state highway right-of-way, and will take them to the nearest maintenance truck station.

Also, the Minnesota Outdoor Advertising Control Act prohibits placing advertising devices (including political signs) on public utility poles, trees and shrubs. 



Utility Training Academy (UTA) specializes in damage prevention training programs designed to build and advance the knowledge and skills needed for accurate line locating and excavation safety.

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-  **Pipeline Locator Training**
-  **Excavation Safety Training**

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Locate Research Survey

THANK YOU in advance for participating in this survey. The research will contribute to the development of our education, live events, magazine content and, ideally, challenge all stakeholders to expand their knowledge base and increase efforts to save lives.

Complete the survey to be entered in a drawing to receive a FREE Yeti mug. Results will be published in the winter issue of *dp-PRO*. Both the survey and the results (once available) will be made available on dp-PRO.com.

Our thanks to PelicanCorp for helping to underwrite the cost of this research. Individual responses are not shared with the underwriter or sold in any way. Infrastructure Resources employees assisting with research will have access to responses as needed.

1. In what capacity are you involved in underground utility locating?

- a. Locator working for a facility owner
- b. Private locator
- c. Excavator
- d. Designer (engineer)
- e. I am not actively engaged in the utility locating process
- f. Other _____

2. How much education should a locate technician have?

- a. Field training is sufficient
- b. Company training programs are fine
- c. A third-party training company should be used to ensure no "bad habits"
- d. A broad-based locator certification program including both classroom and field testing is necessary

3. How often should a locate technician receive continued training or certification?

- a. Annually
- b. 2-5 years
- c. 5-10 years
- d. Never

4. What tools do you use or require for locating buried utilities?

- a. Electromagnetic Locator
- b. Ground Penetrating Radar
- c. Sonde or RFID Marker
- d. Magnetometer
- e. GIS or A/R
- f. Other _____

5. On a monthly basis, how often must a site be relocated due to marks being destroyed?

- a. 0-1
- b. 2-5
- c. 5-10
- d. 10+

6. On a monthly basis, how often does a ticket cover a seemingly unnecessarily broad area?

- a. 0-1
- b. 2-5
- c. 5-10
- d. 10+

7. On a monthly basis, how many times does a job site need to be relocated because the ticket has expired?

- a. 0-1
- b. 2-5
- c. 5-10
- d. 10+

8. On a monthly basis, how often are utilities mismarked?

- a. 0-1
- b. 2-5
- c. 5-10
- d. 10+

9. Rank the risk these locating issues (1=greatest) pose to damage prevention of underground utilities (excluding failure to locate or unreported damage).

- ___ Lack of training
- ___ Insufficient technology
- ___ Shrinking easements and rights of ways
- ___ Over-congestion
- ___ Deeper utilities
- ___ Unlocatable utilities
- ___ Insufficient legislation or enforcement
- ___ Understaffing
- ___ Aging workforce
- ___ Other _____

10. When prioritizing the execution of a locate ticket, which should be the top consideration?

- a. Time received
- b. Due date
- c. Scope of ticket
- d. Type of facility
- e. Location of jobsite
- f. High consequence facilities first
- g. Emergency

11. When hiring a contract locator, what is the priority?

- a. Price
- b. Quality
- c. On-time performance
- d. Risk reduction
- e. Other _____

12. Job Function

- a. Executive (Owner, CEO, COO, CFO, President)
- b. Upper Management (Director, Manager)
- c. Middle Management (Supervisor, Foremen)
- d. Field Operations (Technician, Locator, Operator)

13. Which category best describes the type work you do?

- a. Electrical
- b. Engineering
- c. Excavating
- d. Gas & Oil
- e. GIS Mapping
- f. Government / Regulatory
- g. Locating
- h. One Call
- i. Public Works
- j. Communications
- k. Trenchless Technology
- l. Water & Sewer
- m. Other _____

14. Where do you work?

- a. USA
- b. Canada
- c. Other _____

After completing this survey, **snap a pic and email it to info@emailir.com** or visit dp-PRO.com/surveys to complete it online.



Asset Inspection Survey Results

How do you inspect your assets for maintenance?

With the exception of Water & Sewer, 43% of whom use Asset Inspection Software, all industries overwhelmingly report their inspections are still done using paper forms. The Communications industry reports the highest percentage (65%). Public Works is the industry reporting the most use of custom internal software (31%) while the Electric industry has the highest percentage relying on visual inspections alone (20%).

At what frequency do you inspect your assets?

The Gas & Oil industry reports that 73% inspect their assets yearly at a minimum, with Water & Sewer close behind at 60%. The Electric industry reports most inspections at 2-3 years (60%) while the Communications industry is most likely to inspect only when conditions indicate (55%).

What is the biggest difficulty you face with asset inspection?

The Electric industry overwhelmingly find downtime/disruption of normal operations to be their biggest difficulty related to asset inspection (80%), with Communications (50%) and Water & Sewer (48%). Gas & Oil reports accessing historical data (40%) as equally difficult as downtime (40%). Water & Sewer also believes accessing historical data is a major concern (41%). Inspection costs seem of the least concern to all industries with Public Works reporting highest (22%).

What is the most common reason for asset failure?

Asset failure is not easily attributable to any single reason regardless of industry, although Operate to Failure mentality leads in most. 56% of surveyed Engineers, from across multiple industries, said that Operate to Failure mentality was the most common reason for asset failure.

What factors most contribute to poor decision making for asset maintenance?

Budget constraints are the biggest single factor for Communications (40%), Public Works (56%) and Water & Sewer (43%). Bureaucracy is the biggest factor for Electric (40%), and Gas & Oil is fairly equally distributed across all categories.

Which part of asset management most needs to improve?

The Electric industry lists accurate mapping as the area most requiring improvement (60%) with all other respondents indicating Field inspection process (40%). The Communications industry believes budgeting is the most improvable factor (47%) along with Public Works (40%).

What is the best way to reduce asset inspection/maintenance costs?

All industries agree better planning is the best way to reduce costs, with Gas & Oil leading (60%). Public Works (50%) sees the need for increased spending/budget a close second (44%), while Electric rates them equally (40%).

What is your primary focus in protection of the utility infrastructure?

All industries felt education and training as the primary focus was important, except Public Works (7%). Electric led (60%), Communications agrees (25%) but focuses more on regular maintenance (40%). Water &

Sewer focuses on efficient field inspections procedures (23%) although other industries rated this low. Public Works focuses mainly on Updated GIS to the field (40%) followed close by regular maintenance (33%).

What are the best ways to increase safety in asset maintenance?

Respondents were asked to select as many options as they wished. In order of selected importance:



Some of the most dramatic response differences were not found across industries but across job titles, regardless of industry. For example, when asked the most common reason for asset failure, 60% of Executives answered, "Failure to perform preventative maintenance". In comparison, Field Operations employees provided that answer 39% of the time, Upper Management 31%, and Middle Management 24%. 

To review the full survey, complete a survey, or provide additional insight or feedback on the results, visit dp-PRO.com/surveys.

Innovations Target Reducing Underground Utility Damage during Construction

BY GEOFF ZEISS

The \$10 trillion global construction industry is facing a crisis. For many of the world's advanced economies including Japan, Germany, U.S., South Korea, and U.K., construction productivity has been stagnant or even declining. Historically, investment in research and development by the construction industry has been very low compared to other industries. However, 2018 was an inflection point with venture capital investment in startups in the construction sector quadrupling.

Underground utilities are an important contributor to low construction productivity. According to the Federal Highway Authority (FHWA), underground utilities are a major cause of delays on civil construction projects. Comparing utility damage in the United States and Japan reveals a startling difference between the two countries. In the United States, utility damage is between 400,000 and 800,000 incidents per year. In Japan, the number of incidents in 2016 was 134. Clearly something can be done to reduce the risk on underground utility damage during construction.

TECHNICAL ADVANCES IN DETECTION AND CAPTURE

As a result of accelerating investment in detection technology, new developments are changing how underground utilities are located and digitally mapped. Electromagnetic (EM) detection is the industry standard and used by most locators. However, a major drawback to EM is that it involves a manual process which results in marking the ground, but it does not produce a permanent record of the location of the utilities detected. A recent development combines EM detection with GNSS (and RTK for high accuracy) and digital recording to capture an accurate digital record of the location of detected utilities.

Advances in ground-penetrating radar (GPR) have made it possible to safely capture scans at roadway speeds. Stacking, or statistical av-

eraging, is increasing the depth where GPR is effective. One of the important inhibitors to the broader use of GPR, for example, among surveyors is that interpreting GPR scans has required a trained geotechnician. New GPR post-processing software combines successive scans to produce a tomographic image of underground utilities rather than the typical hyperbolas. This capability simplifies the interpretation of GPR scans, enabling surveyors and other professionals to use GPR technology effectively.

The simultaneous capture of above- and below-ground scans using Lidar and GPR can create a complete 3D model of all existing infrastructure for planning, design and construction. Inertial mapping can be used to map underground pipe networks for up to two kilometres. Acoustic locating has been shown to be effective in detecting underground objects down to 30 feet.

Mixed reality applications for visualizing underground utilities on mobile devices are increasingly being deployed to the field. Existing 2D and 3D records and site investigation results can be integrated into a 3D model to provide greater context for visualizing above- and below-ground infrastructure in augmented reality.

TECHNICAL DEVELOPMENTS IN RECORDING AND SHARING

In the U.S., it has been estimated that \$10 billion is spent annually locating existing underground utilities. This includes utilities and telecoms responding to One Call notifications either using commercial locate services or their own staff, and efforts by excavators to detect and verify

the location of underground utilities prior to commencing digging. The result of these locate efforts is typically painted or flagged on the

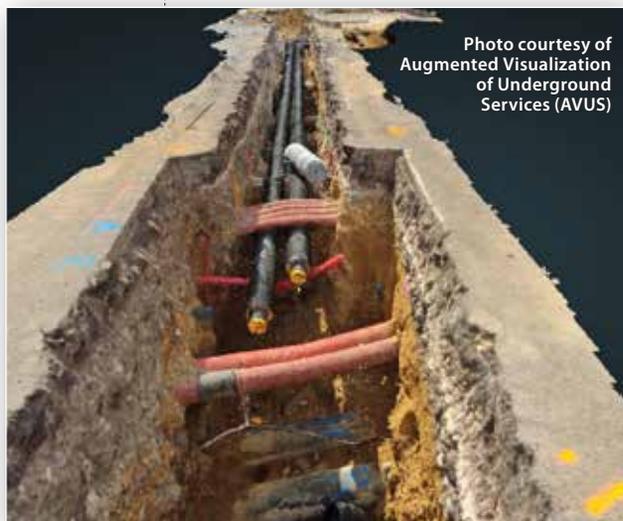


Photo courtesy of Augmented Visualization of Underground Services (AVUS)

ground, but often it is not recorded on paper or digitally. At best, this data becomes part of project documentation and is effectively lost at the completion of the project.

Recent legislation in some jurisdictions requires the digital recording and sharing of the results of locate operations. Online systems have been developed to share the location of underground infrastructure among stakeholders in construction projects. The Colorado Department of Transportation (CDOT) has adopted a hybrid online system that incorporates elements of survey and GIS technology and enables the recording and sharing of information about underground utilities among CDOT, large and small construction contractors, network operators, and other stakeholders. Access to this data is provided over the web, enabling staff to access underground utility location maps on a handheld device in the field.

Some jurisdictions are even creating open portals with access to publicly available maps of

underground infrastructure. For example, the Colorado Oil and Gas Conservation Commission (COGCC), which requires the oil and gas industry to provide accurate maps of flow and gathering lines in the state, has created an open portal where maps of these underground lines are open to the public.

IMPROVING DATA QUALITY

A key challenge in reducing damage to underground utilities is the low quality of the existing records maintained by many network operators.

Some jurisdictions are mandating that survey-grade as-builts be submitted for all new underground infrastructure. For example, the state of Montana has recently made it mandatory that survey-grade as-builts stamped by a PE or PLS be submitted on completion of construction. However, for smaller projects it may not be cost-efficient to conduct a traditional survey. New developments in technology are providing other options. For newly-installed pipelines, Lidar is being applied to efficiently capture location to millimeter precision prior to filling the trench. New reality capture solutions can generate as-builts accurate to \pm five centimeters from a video taken with an Android smartphone using RTK GNSS or accurately surveyed control points.

In addition, improving the quality of records of existing infrastructure is essential to enable continuous reduction in underground utility damage. The Colorado online system provides for feedback from handhelds in the field during construction. This increases field staff engagement and enables staff to actively contribute to improving the locational accuracy and other information about existing underground infrastructure.

RELIABLE METRICS

Reliable metrics are essential for assessing the social and economic impact of utility damage and the effectiveness of new policies, legislation, regulation, and technologies in reducing underground utility damage. In North America, the Common Ground Alliance (CGA) has been collecting voluntarily submitted incident reports since 2003. Based on this data, CGA statistics reveal that utility damage, when prorated to construction ac-



tivity, is actually increasing. In the Netherlands, an online One Call system called KLIC has been implemented. Reporting incidents of utility damage is mandatory. The statistics reveal that while construction efficiency has improved, there has been no reduction in underground utility damage. In Japan and at Heathrow International Airport where programs of continuous improvement have been implemented, statistics reveal a sustained long-term reduction in underground utility damage.

CONCLUSION

A review of recent international initiatives involving changes in legislation, regulation, and business processes as well as new technical developments concluded that a successful program for reducing utility damage during construction not only avoids service disruptions and prevents injuries and fatalities, but also improves construction productivity by reducing the risk of project delays and budget overruns. However, it also concludes that there is no silver bullet for reducing utility damage during construction. A comprehensive approach involving many stakeholders is required, but there are significant additional benefits. Reducing risk reduces insurance costs for an industry where margins are typically low. Furthermore, developing and maintaining an accurate 3D map of underground infrastructure has potential benefits for other use cases beyond construction such as utility outage management,



disaster planning, emergency response, urban digital twins and smart cities.

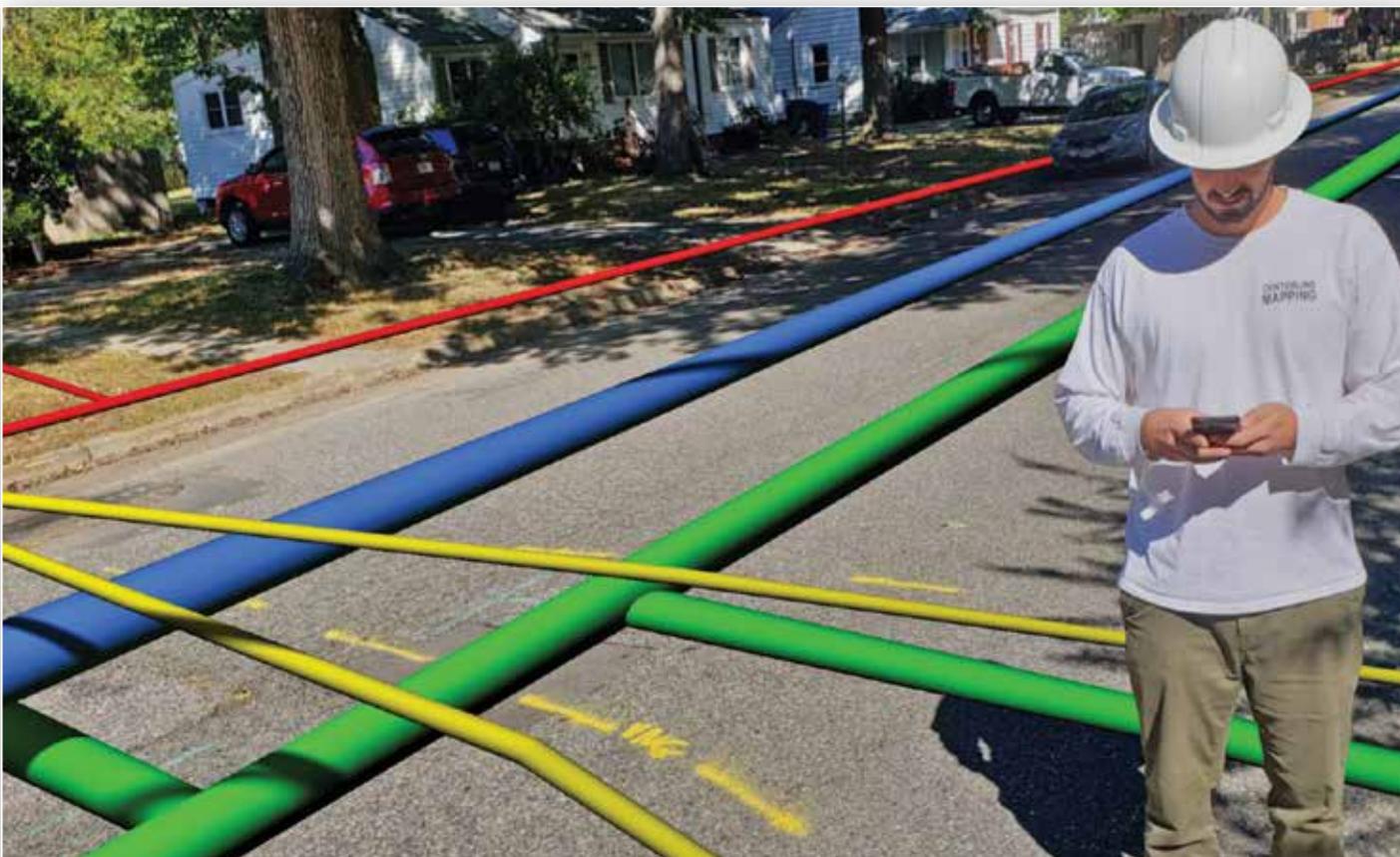
The white paper *Reducing Damage to Underground Utility Infrastructure During Excavation* has been published by the Geospatial Information and Technology Association (GITA) and is available for free download at gita.org. 

Geoff Zeiss is a scheduled speaker at the 2021 Global Excavation Safety Conference.

Geoff Zeiss tracks the contribution of geospatial technology to the digitalization of the construction and energy industries on his "Between the Poles" blog and other media. His area of special focus is locating, mapping, and sharing information about underground utility infrastructure.

My Introduction to GIS

BY TYLER BRISTOW



Looking back, I can remember the first time I ever heard the term, GIS. A 19-year-old sophomore attending Radford University, I was at the library about to enroll in courses for the fall semester. On the list was Introduction to GIS (Geographic Information Systems) and I signed up without hesitation. I was immediately intrigued; maybe because of my landscaping background or the few introductory Geology courses I had already taken to help me understand the underground. Little did I know this course would lay the groundwork for the rest of my career! But, what on planet Earth was so interesting about GIS, and what did I learn?

I learned that GIS is a program used by millions of people around the globe to solve problems. People use GIS to map, model, and visualize data, including underground gas reservoirs and wells,

as well as underground utility assets such as gas lines, water valves, storm drains, and much more. GIS is a visualization and analytical tool that delivers answers which are normally buried beneath the surface. I quickly learned the value GIS has to offer to the utility industry.

By using GIS, utilities and facilities can better operate and manage their systems. With one central database rather than a cabinet or local hard drive full of hundreds of as-built drawings with no organization or revision process in place, end users can quickly see their updated information on one map. All as-built information and GPS data is converted, integrated, and accessible on any device, anytime, anywhere giving people answers fast when they need them.

With GIS technology, utilities no longer worry about which folder the latest drawing is in, or which contractor has the latest redline markups, or have an engineer spend countless hours opening hundreds of individual CAD drawings and test-hole reports for a few diameter values. GIS is the answer to these workflow inefficiencies. As utility systems are marked, designed, and built, GIS data is updated to reflect the true configurations of what is underground. We take all sources of information and update the map, and keep it updated as more and more data is collected.

GIS technology is not new to the utility industry; it has been around for decades. With latest advancements in technology such as smartphones, cloud platforms, mobile GPS, and Augmented Reality, GIS is no longer your single tool for draw-

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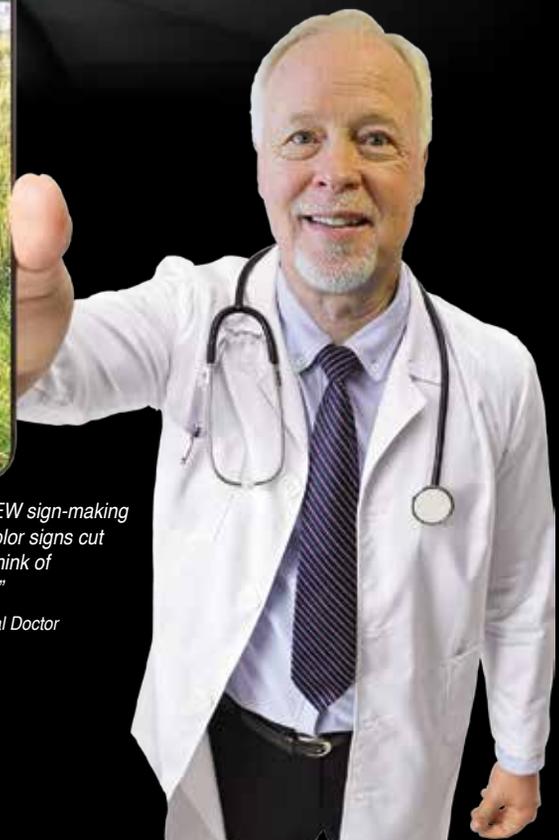
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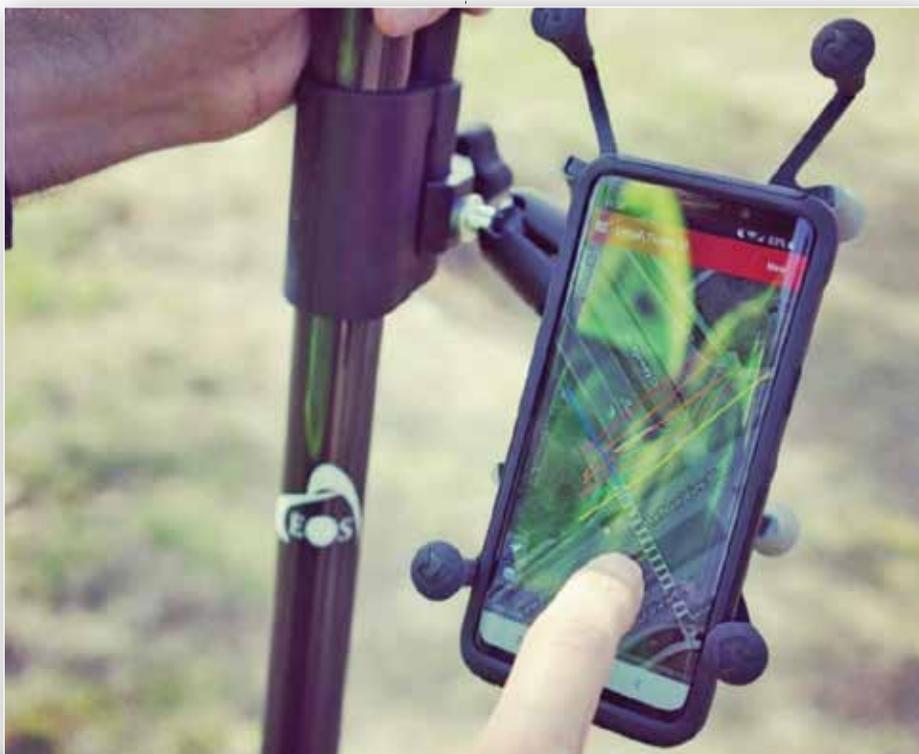
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ing points and lines on aerial imagery; it's now an entire platform for understanding, integrating, and optimizing the operation of utilities. Engineers, surveyors, technicians, planners, and upper management all contribute and benefit from the value of a well-implemented and well-funded GIS. GIS technology allows utilities to integrate data from additional software platforms such as SAP, SCADA, SharePoint, visualize scenarios & risk potential, identify conflicts, solve complicated problems, present powerful ideas, and develop effective solutions accurately.

BENEFITS OF GIS TO UTILITY DEPARTMENTS & FACILITY OWNERS:

- **Conflict Detection**
- **Damage Prevention**
- **Operational Costs Reduction**
- **Save Time Relocating Utilities**
- **Enhance Asset Management Workflows**
- **Efficiently Manage New & Aging Infrastructure**
- **Boost Public and Customer Relationships**
- **Achieve Maximum Productivity**



Companies need to know what assets they own and where they are buried. Utility costs are rising and more and more utility departments and facility owners are turning towards GIS to help reduce overall expenses. GIS data is becoming a required deliverable on RFPs, meaning utility locating and mapping firms are required to deliver these services and data formats. The good news is that it is not too late to begin learning and offering GIS services. The lack of accurate underground utility data is creating a massive opportunity for jobs around the globe. Utility locators and surveyors are in a great position to start offering GIS services to help utilities and facilities improve their maps and data.

BENEFITS TO UTILITY LOCATING, SURVEYING, AND ENGINEERING FIRMS:

- **Win Multi-Million Dollar GIS Contracts**
- **Land Repeat Business with Clients**
- **Blow Past Your Competitors**
- **Sharpen Your Business Blade**
- **Become the "Go-To" Locating Firm**
- **Grow Your Business and Client Base**

GIS software will continue to evolve as an important piece of software utilized by utilities and facilities. There are several ways to get started using GIS includ-



ing YouTube and other online GIS training courses. 

Tyler Bristow is a certified GIS Professional (GISP) with over ten years of experience. He is Owner and Founder of Centerline Mapping. Visit his online GIS training course, Utility Mapping Bootcamp at centerlinemapping.com or contact him at tyler@centerlinemapping.com.





Is Your Board Planning for Excellence?

BY NANCY DAVIS

The damage prevention industry has seen tremendous positive change in its history as 811 centers have grown in influence and effectiveness because of advances in areas such as legislation, technology, and staffing. But what about the future? Are you prepared with plans that will help ensure your continued success? Consider:

- **Has your board developed a strategic plan that provides direction for your 811 center, with measures to ensure you're getting where you want to go?**
- **Have you planned business continuity, especially considering the interruptions from COVID-19?**
- **Do you have an orientation and training plan to equip your board members to fulfill their responsibilities?**

Each of these plays an important part in the success of your 811 center. Even the best trained boards need purpose and direction to ensure they make decisions that move the organization forward. As Laurence J. Peter (Peter Principle) said, "If you don't know where you're going, you will probably end up somewhere else." Developing strategy is a key board responsibility. The board is responsible for casting vision and providing direction for staff as they implement strategies to accomplish the mission. Key elements of strategic planning include:

1. **Developing/adopting the organization's mission**
2. **Identifying the organization's internal strengths**
3. **Identifying areas that need improvement**
4. **Identifying new opportunities on the horizon**
5. **Identifying threats to your success**
6. **Developing strategic goals and objectives that drive excellence**
7. **Developing a plan for consistent monitoring and assessment**

An example of why strategic planning is so important is the recent reaction to the spread of COVID-19. Many 811 centers and countless businesses had to make unexpected, immediate changes to comply with social distancing requirements and facilitate working from home. There have been other catastrophic challenges (such as the tornado that destroyed Alabama 811's building) that have raised awareness of how critical it is to have a proactive plan for business continuity. Your 811 board needs to ensure that the center has a plan and is prepared to continue operations when normal business is not possible. This may be accomplished through the strategic plan or policies and procedures. The best time to develop a business continuity plan is **now** while the operational changes you recently made are fresh and before you need it again.

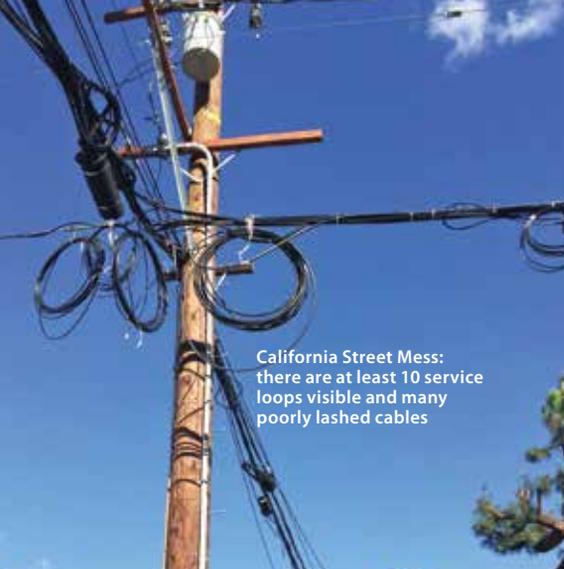
It is also essential to train and equip board members to understand and assume their respon-

sibilities, including strategic planning. Many people are recruited to serve on a nonprofit board without training on what is expected of them. Others may serve for years and still find themselves making decisions from their employer's perspective rather than the 811 center's perspective. It is important to offer orientation to new board members soon after they are elected. One aspect of orientation that is always helpful is a visit to the 811 center to meet staff and learn about the operations.

The line sometimes blurs between what the board is charged with doing and what the board should delegate to the CEO/ED. Having a clear understanding of this will make your board more effective. While this is especially important for new board members, the most effective boards provide periodic training for experienced members to ensure continued understanding. One area that often needs to be clarified on an 811 board is the responsibility to serve the 811 center, not the board member's employer. Having open discussion about this, including addressing how to handle conflicts of interest, is helpful in avoiding confusion.

This industry is important. It makes a difference in saving lives, protecting property, and improving service levels. I have personally experienced the effect that a serious digging accident has on employees and their families. That's what we're all working together to prevent. As you serve your 811 organization, I encourage your board to develop plans for strategic direction, business continuity, and board development that will help you achieve excellence. **DP**

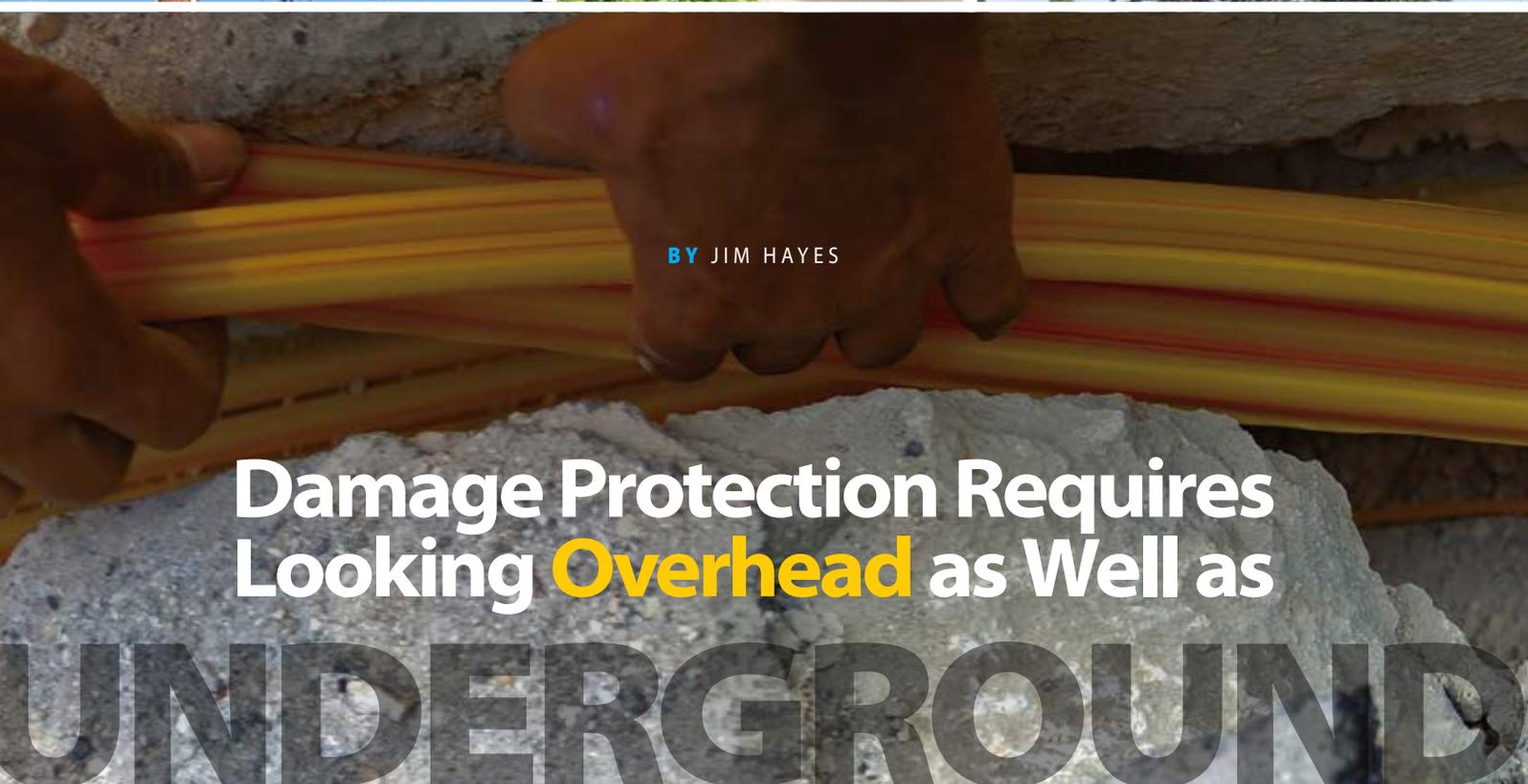
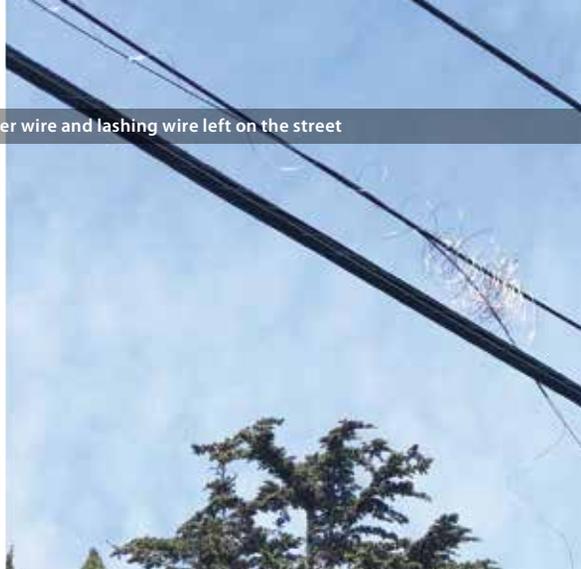
Nancy Davis, principal, Davis Planning & Consulting, LLC can be reached at nancydavis811@gmail.com.



California Street Mess: there are at least 10 service loops visible and many poorly lashed cables



Messenger wire on Idaho Street: coils of messenger wire and lashing wire left on the street



BY JIM HAYES

Damage Protection Requires Looking **Overhead** as Well as

UNDERGROUND

THERE IS AN OLD TERM I HAVE USED FOR YEARS in lecturing about fiber optics that most cable damage is called “backhoe fade.” At one seminar, a person from Bonneville Power responded that with his aerial cable plant in the western ranges, it was called “target practice.” Besides improving my lectures using his comment, it opened my eyes to aerial installation practices.

What I’ve seen isn’t pretty. Workmanship in aerial cable installations is sometimes very “neat and workmanlike,” a term I picked up from writing standards, but more often, it is terrible. It is so bad that the Fiber Optic Association (FOA) has gotten calls from upset government officials asking if there are standards for aerial construction, to which I answer, “Only if you write them.”

Fiber optic industry standards generally cover components and testing, not installation. Requirements for cable installation - underground or aerial - are mostly covered in a project SOW (Scope of Work) or other contract documents. Since every project is unique, the installation requirements are mainly in the project documentation.

Without standards for workmanship, you can imagine what happens. Underground cables are mostly abused while being pulled into conduit, overstressed by high pulling tension or exceeding cable bending limits. Aerial cable abuse is much more creative.

We see aerial cable held up with cable ties instead of proper lashing. We see drooping cables not fully lashed, cables bent much too tightly and large coils of cable left hanging

on poles. We see bundles of maybe a dozen cables lashed together, probably exceeding the weight limit of the messenger wire.

The worst instance I’ve seen is a “figure-8” coil of about 300m (1000 feet) hung on a pole near a transit line in Los Angeles. When I first spotted it, I assumed it was left as temporary storage and the crew would be back quickly to finish the job. That coil was there for more than six months. Can the messenger handle hundreds of pounds of cable left hanging there? Bare loops of cable hanging off the messenger is an invitation to get damaged.

And that is what this is all about – damaging aerial cable. Obviously, large heavy loops of stored cable create stress on the messenger and cables attached to it, amplified by stress caused by wind, rain and especially snow and ice in winter.





Figure 8 loop hung on messenger



The problem with aerial cable is the same as the problem with underground cable – careless contractors. Consider the potential damage these contractors can do to cables already in place when they do their work. If the workmanship we see is bad, what are they doing to other cables during their installations?

The situation has been made even worse in the U.S. by new FCC guidelines called “One Touch Make Ready” or OMTR. OMTR allows a contractor to not only install cables but to move other cables to make room for their installation. They can also “overlash” their cables to current cables without installing their own messenger.

Owners of aerial cable plants need to be aware of the potential damage to aerial as well as underground cables, and organizations focused on damage to underground cables might well look overhead also. Perhaps we need a One Call to remind owners of aerial cable that someone is working around their cables. **DP**

Jim Hayes is a VDV writer and trainer, and the president of The Fiber Optic Association. You can reach him at jim@thefoa.org.



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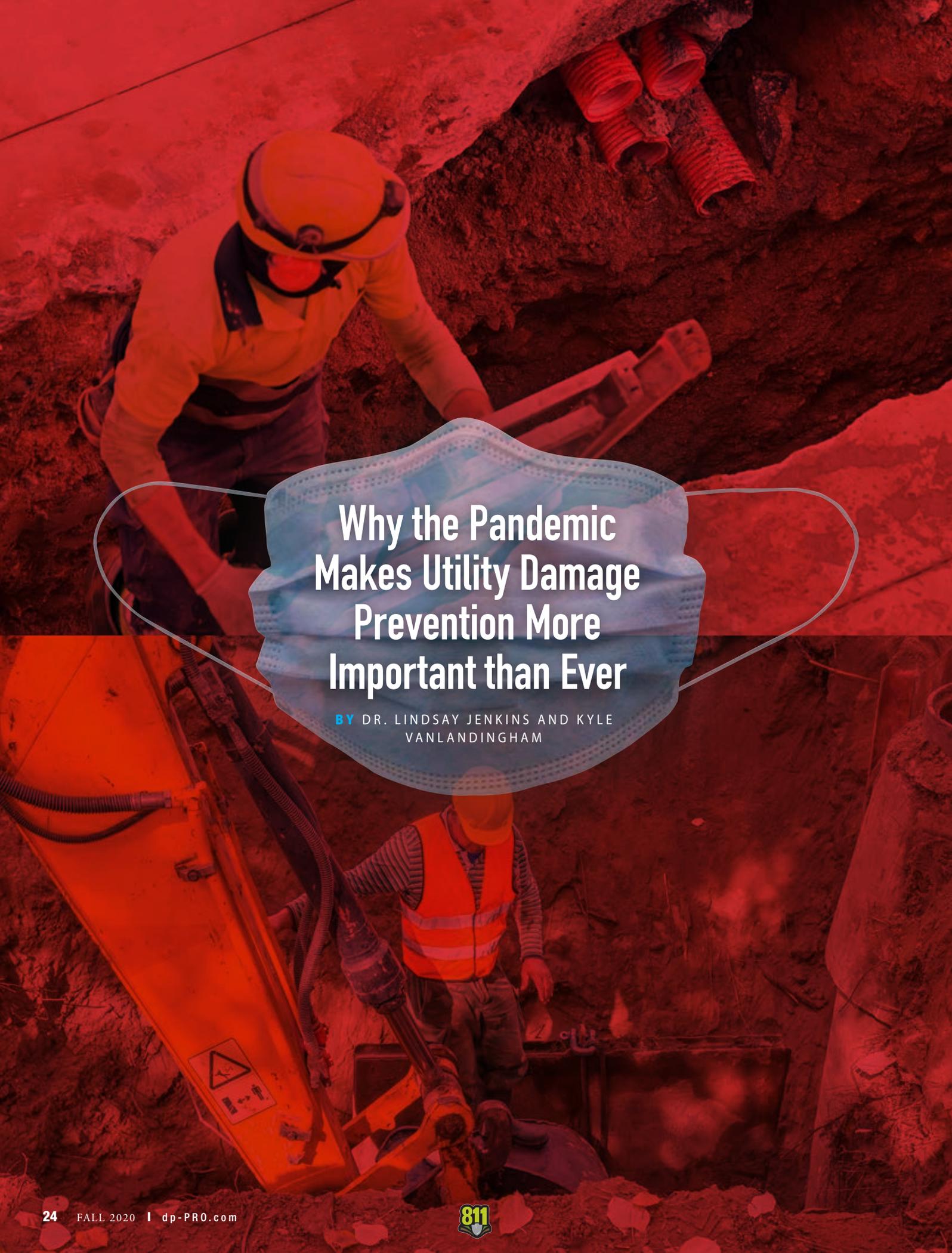


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A high-angle photograph of a construction worker in a trench. The worker is wearing a yellow hard hat, a yellow long-sleeved shirt, and dark pants. They are leaning over a large pipe. In the background, there are several large pipes protruding from the ground. A blue surgical mask is superimposed over the center of the image, with the title text inside it. The entire image has a red color cast.

Why the Pandemic Makes Utility Damage Prevention More Important than Ever

BY DR. LINDSAY JENKINS AND KYLE
VANLANDINGHAM

The COVID-19 stay-at-home orders have posed unplanned challenges for the utilities and mid-stream asset operators responsible for protecting critical infrastructure. Not only are utilities operating with strained resources, but at the same time the threats to energy infrastructure have only increased with excavations on the rise. In fact, Texas811 data shows that there were 8.3% more damages to underground energy infrastructure in April of this year than in April of 2019, and damage rates have been climbing month over month since the start of the pandemic.

When a damage to an underground asset could cripple a medical facility on the front lines

the risk of a catastrophic outcome like taking a hospital offline.

Utility companies do not always get credit for the vital work they do to provide Americans with the heat, power, water, and communications we all need to live our lives. During this pandemic, a society stuck at home is waking up to their im-

DAMAGE PREVENTION IS EXTREMELY DIFFICULT EVEN IN THE BEST OF TIMES. TACKLING THE CHALLENGE DURING A PANDEMIC CAN SEEM IMPOSSIBLE. TO ADAPT, UTILITIES NEED TO ACCELERATE THEIR ADOPTION OF ADVANCED TECHNOLOGIES, INCLUDING PREDICTIVE ARTIFICIAL INTELLIGENCE (AI), TO UNDERSTAND RISK.

of the pandemic, damage prevention has never been more critical. Utilities are stepping up during these extraordinary times, but tackling a challenge of this magnitude requires more than hard work; it requires new approaches and new technology.

Third-Party Damage Risk is Rising

Commercial construction is accelerating. Most states have deemed construction an essential service and have allowed operations to continue with protective measures in place. Local governments and contractors are taking advantage of empty highways, streets, and business districts to accelerate work. Locate requests in Texas were up 18% from April to May as work accelerated across the state.

The uptick extends to the home as well. People sheltering in place are taking advantage of the increased time at home and warm weather to tackle home improvement and landscaping projects. Between March 23, when the Texas stay-at-home orders went into effect, and May 15th, homeowner online ticket submissions to Texas811 were up 140%, indicating a massive rise in homeowner digging projects. Homeowners are less likely to call 811 prior to embarking on projects than professional excavators are, and utilities around the country are bracing for a spike in unsafe digging.

The Stakes Could Not Be Higher

Third-party damage can impact infrastructure critical to the COVID-19 response, including hospitals, fire stations, and emergency dispatch centers. With hospitals already overwhelmed, they cannot afford power outages or gas leaks. A damage to the wrong asset could cost lives.

Although much has changed in our lives with the pandemic, damage prevention is more important than ever. Public awareness campaigns can have a meaningful impact, but damage prevention is about more than calling 811. Utilities need robust systems in place to understand which of the millions of 811 tickets they receive are the riskiest to stop the most possible damages and save lives.

The Role of Technology

Damage prevention is extremely difficult even in the best of times. Tackling the challenge during a pandemic can seem impossible. To adapt, utilities need to accelerate their adoption of advanced technologies, including predictive artificial intelligence (AI), to understand risk.

We are seeing utilities across the country leveraging AI to assign risk scores to 811 tickets. They are even able to use these new tools to analyze the consequence of a damage to see whether a specific dig runs

portance. Utilities are the front-line workers in the battle to keep critical infrastructure working so that society can fight this virus. With damage prevention moving into the spotlight, utilities must innovate to rise to the occasion. **DP**

Dr. Lindsay Jenkins is Director of Utility Solutions at Urbint, and Kyle VanLandingham is Director of Customized Solutions for Texas811.



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It is important to conduct full investigations when gas line damage and a resulting gas explosion occur. Bison Engineering has conducted extensive research on this subject from the available data. A number of variables usually contribute to each incident, so extracting the most information out of each incident is extremely important. In 2015, the American Petroleum Institute developed a recommended practice for Pipeline Safety Management Systems. API RP 1173 recommends a full investigation of each incident. From the data collected and analyzed, future incidents can be limited or prevented because risk assessments can be continually improved. I recommend that investigations include many parameters that have not been routinely recorded in the past.

We have reviewed hundreds of incidents and collected and sorted numerous conditions of those incidents. Just sorting basic data has revealed some useful patterns. We found through extensive testing and review that most structure explosions occur at a distance of less than 50 feet from the pipeline damage. Gas mains are usually routed along one side of a street. We have found that house fires and explosions usually occur on the same side of the street as the gas main. Why? Because the house on the other side of the street is more than 50 feet from the damaged pipe. Many additional questions could be answered with even more information. It's important that the industry collect more complete information to answer these questions.

For example, how far can gas "travel" to cause an explosion? What is the transportation mechanism of soil gas migration? How do soil conditions affect soil gas migration explosions?

We concluded that collecting better information can provide much more comprehensive data to analyze for risk assessments. This can be done by simply sorting the data from each incident. First responders have to assess a broad range of parameters very quickly when they arrive at a site. They need the most accurate information available. With more comprehensive collection of data and a better analysis of each case, more targeted risk assessments can be utilized as tools in the future. Document:

1. **Radial distance from the damaged pipe to the nearest structure and other damaged structures**

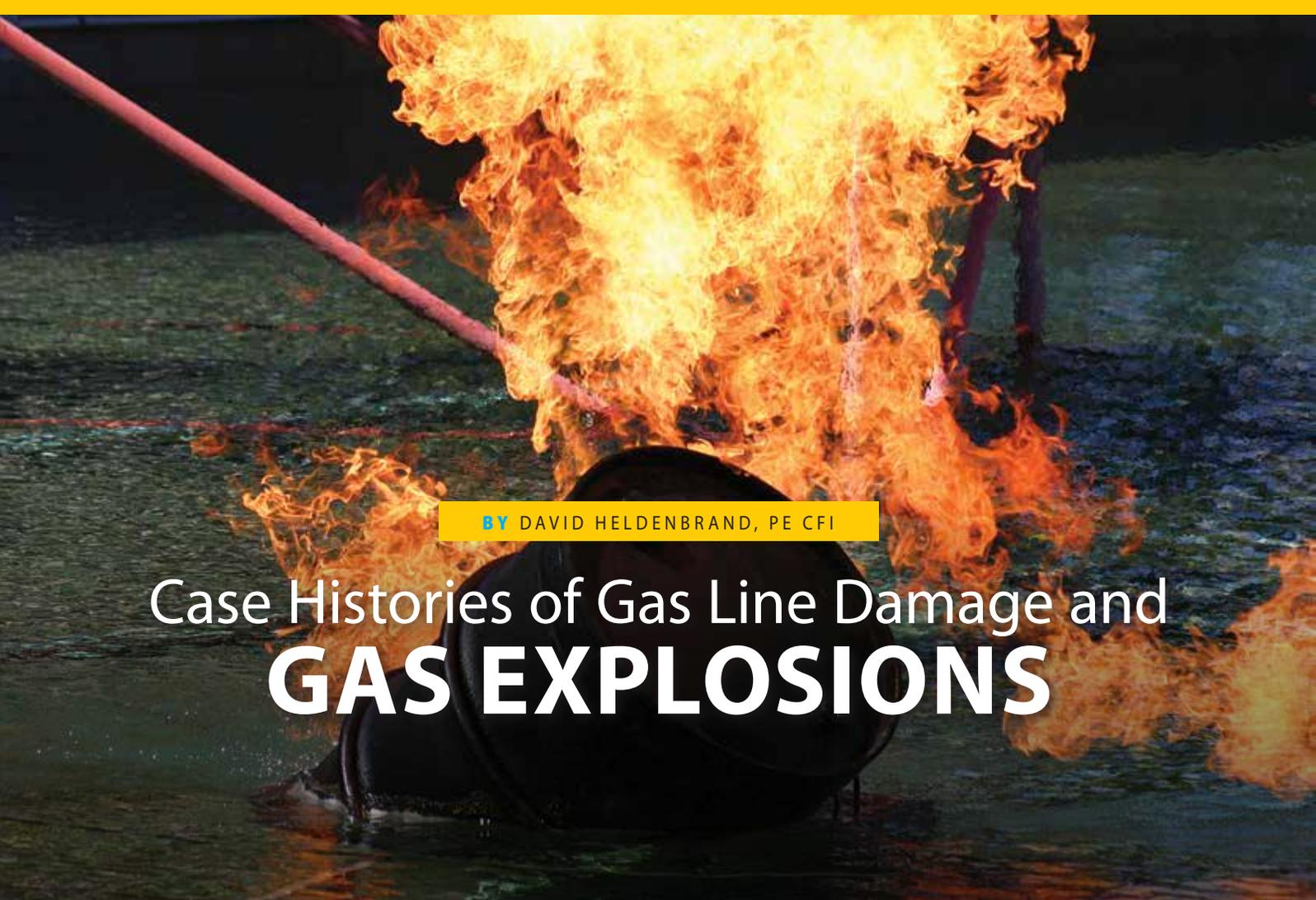
2. **Surface conditions radially from the damage**
3. **Radial distance of visual indications of gas flow from the ground**
4. **The time the damage occurred and the time of ignition**
5. **Soil type (even approximately, if necessary)**
6. **If the involved structure is at a higher or lower elevation than the pipe**
7. **Pipeline pressure**
8. **Extent of damage to the pipe and diameter of the pipeline**
9. **Location, depth and route of other utility lines near the damaged line**
10. **Extent of gas smell or lack of gas smell**

Many of these items seem very routine but are missing in most reports. This basic data can be extremely useful for future risk analyses. All of these items can be readily assessed in an investigation and when sorted and analyzed, can provide guidelines for risk assessments by first responders. **DP**

David Heldenbrand is president of Bison Engineering. He is a licensed Professional Engineer and a Certified Fire Investigator. He can be reached at dave@bisonengineering.com.

BY DAVID HELDENBRAND, PE CFI

Case Histories of Gas Line Damage and **GAS EXPLOSIONS**



Taking the Uncertainty Out of 3D GPR Array Integration in SUE

BY MATTHEW J. WOLF, PRESIDENT, IMPULSERADAR USA, INC.

The fundamental core of the SUE profession is a complete understanding of the principle of uncertainty. The SUE professional, whether a licensed Professional Engineer or Professional Licensed Surveyor, or other qualifying professional, must understand this principle. These professionals operate under the relevant statutes in their respective state and sign off on the SUE deliverable having assessed each segment of a utility and is, in their judgement, represented by the relevant quality level of uncertainty. Each utility segment depicted on the final drawing is assigned a QL level from QLD to QLA under ASCE 38-02 *Standard Guideline for Collection and Depiction of Existing Subsurface Utility Data*.

Geophysical methods employed stand at second place in the uncertainty scale as QL B, only usurped by exposing of the utility through vacuum or other means of safe excavation. Even QLA does not represent an absolute in terms of certainty that the utility segment is properly identified as any SUE professional can tell you detection and exposure sometimes yields the unexpected!

One of the most recent advancements in geophysical methods involves GPR array systems for large scale or highly complex SUE investigations. As with any reasonably new entrant of technology not yet universally integrated into an established practice such as SUE, value must be demonstrated. This transcends from the professional SUE provider to the end client paying for the deliverable. The degree of certainty having deployed the method adds value to the final deliverable must be apparent throughout the process. Certainty by the very definition, according

Merriam-Webster, is the quality or state of being certain especially on the basis of evidence. Evidence from SUE professionals and research that have integrated these platforms in their respective projects are compelling enough that ASCE 38 and its upcoming updated version will include 3D depiction and collection methods such as multi-channel/array GPR.

Knowledge is inextricably linked to reduction of uncertainty. Two-dimensional GPR is universally accepted and understood in the SUE profession and the concept of the array is generally known. However, the very idea of 3D imaging seems like a quantum leap to the everyday GPR practitioner. Nothing can be more certain than it is simply not a quantum leap but rather a natural progression.

Continue reading this article and learn how to de-mystify 3D GPR Array Processing in the *dp-PRO* digital edition at dp-pro.com/current-issue



BY STEVE SELLENRIEK



Uncovering the Next GENERATION of Workers

Solving the underground construction worker shortage through collaborative training and an industry rebrand



With millions of people forced to work or learn from home during the COVID-19 pandemic, it's become clearer than ever that the country needs to expand and build on its broadband and fiber infrastructure. For a contractor in the underground construction industry, this should be great news.

Unfortunately, most contractors will tell you they still have a problem – there aren't enough workers to staff their crews or operate their machines.

According to the Associated General Contractors of America (AGC), 80% of construction firms report having difficulty filling the positions that represent the bulk of the workforce. To put that in real-world terms, Sellenriek Construction has enough demand for work and enough equipment to manage at least six more crews – if there were enough workers to staff them.

Our industry needs to prioritize training and workforce development, and we need to rebrand our profession to help improve how the younger generation views underground construction jobs.

Solving the Worker Shortage Together

Contractors, industry groups and manufacturers alike are offering up solutions to help solve the worker shortage.

Contractors are offering better pay and benefits. Organizations like Power and Communications Contractors Association (PCCA) have made workforce development one of their top initiatives, offering scholarships for children of PCCA members and their employees. And manufacturers like Ditch Witch provide free, online training modules to simplify workforce development utilizing a digital format that's familiar to younger generations.

Educational initiatives like the Utility Systems Technician program at the State Technical College of Missouri are also helping develop the next generation of workers. Established in part by PCCA, with the help of industry partners like Sellenriek Construction, the program is designed for prospective utility workers.

"Our students are looking for a comprehensive educational experience in underground construction and the industry is eager for young talent," said Shawn Strong, president of the State Technical College of Missouri. "With the support of underground construction leaders, manufacturers and contractors, we're creating a win-win scenario for the industry by educating workers to take on jobs that need to be filled."

Approved by the PCCA, the program gives students a well-rounded education of the industry by providing hands-on experience in undergrounding, horizontal directional drilling, vacuum excavation and other skills that a successful contractor needs.

With new equipment donated to the program by Ditch Witch and Subsite Electronics, students can learn best practices on the latest equipment, so when they get out in the field, they're ready to contribute immediately.

More Work to Do

Efforts like the Utility Systems Technician program are proving to be critical to helping solve our industry's worker shortage problem. At Sellenriek Construction, over 70 employees are graduates of the State Technical College of Missouri program. Unfortunately, many contractors don't have access to a similar pipeline of talent. Industry and academia should work together to make sure there is a Utility Systems Technician program in every state to provide a skilled workforce.

Too often, young people don't see broadband installation as a viable career and dismiss underground construction as dirty, simplistic and unrewarding. However, the truth is, our industry is for problem solvers, hard workers and people interested in new technology.

By reminding young people of that, and by investing in educational and training programs, we can create a new generation of workers for our industry, which the country needs more than ever. **DP**

Steve Sellenriek is president of Sellenriek Construction, Inc. and has been involved in the underground construction industry for over 20 years. He is past president of the PCCA and currently sits on the board of the State Technical College of Missouri.



DIRT FACTS CGA

EXCERPTED FROM THE 2018 DIRT ANNUAL REPORT

The Following NEW Questions were added to DIRT in 2018

- **DID THIS EVENT INCLUDE A CROSS BORE?**
- **WAS THE WORK AREA WHITE LINED?**
- **IS THE FACILITY OWNER EXEMPT FROM ONE CALL CENTER MEMBERSHIP?**
- **IS EXCAVATION AND/OR EXCAVATOR EXEMPT FROM 811 NOTIFICATION?**
- **WHAT IS THE MEASURED DEPTH FROM GRADE?**

WANT TO KNOW MORE? THIS INFORMATION WAS EXCERPTED FROM THE 2018 DIRT ANNUAL REPORT. ACCESS THE ENTIRE REPORT AT CGA-DIRT.COM.

FOA Celebrates 25th Anniversary

The Fiber Optic Association, Inc. (FOA) celebrated 25 years of serving the fiber optic industry as its primary source of technical information and independent certifying body in July. FOA, an international non-profit educational association, was founded by more than a dozen fiber optics trainers and leaders from education, industry and government.

As part of celebrating their 25th Anniversary, FOA has released a short history of the organization and how it has developed over the years. Check out the fall issue's digital edition at dp-pro.com/current-issue to learn more! 




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Celebrate Damage Prevention Week™

• STAFF REPORT •

TAKING PLACE MARCH 22 - 28, Damage Prevention Week™ (DPW) is the perfect setting to bring together major industry stakeholders to discuss new ideas. Face to face, leaders will have the invaluable opportunity to discuss ways to prevent damage to both underground and overhead infrastructure and improve safety in the excavating community.

The global reach and influence of the Global Excavation Safety Conference makes it the ideal venue to debut the first annual Damage Prevention Week™. The international diversity of the conference is unique and sparks valuable conversations, connections, and ideas.

Damage Prevention Week™ has only one agenda - to create a yearly forum focused on reducing damages and improving excavation safety. All views and stakeholders are welcome and encouraged to participate. DPW is a chance for thoughtful, open discussions that lead to learning from one another. Ultimately, those are the discussions that will result in reduced damages and lives saved.

Many organizations are working with Infrastructure Resources to host events held in conjunction with the Global Excavation Safety Conference, including:

- CBSA Leading Practices on Cross Bore Safety Course

Tuesday, March 23, 8:00 am – 12:00 pm

Learn how to prevent cross bores to save money and save lives! Created to provide guidance for minimizing utility conflicts due to cross bore strikes, this course covers a wide range of cross bore safety topics, from the evaluation of existing cross bores to regulatory requirements. Learn more: globalexcaavationsafetyconference.com/crossboresafety



- Global GPR Congress

Monday, March 22, 1:00 pm – 5:00 pm; Tuesday, March 23, 8:00 am – 12:00 pm

This global GPR event is focused on bringing together new and experienced users from both the academic and private sector to benefit the industry by providing a forum for open discussion and continuous learning through shared ideas and experience. Learn more: globalexcaavationsafetyconference.com/gprcongress

- CAMO Lunch & Learn

Tuesday, March 23, 10:00 am – 2:00 pm

Join CAMO (Coastal and Marine Operators) as they explore the issues and challenges in preventing spills, releases and damage to coastal and marine pipelines which negatively impact the environment and public safety. Lunch provided for everyone who pre-registers. Learn more: globalexcaavationsafetyconference.com/camo



Organizations holding meetings in conjunction with Global Excavation Safety Conference include:

- **Distribution Public Awareness Council (DPAC)**
- **Geospatial Information and Technology Association (GITA)**
- **Gold Shovel Standard**
- **North American Telecommunications and Damage Prevention Council (NTDPC)**
- **Pipeline AG Safety Alliance (PASA)**

- **Pipeline Association for Public Awareness (PAPA)**
- **Utility Engineering and Surveying Institute (UESI)**

Meetings can range from annual meetings to User Group or Membership meetings. Infrastructure Resources provides FREE meeting space while space remains available. For more information about Damage Prevention Week™, participating groups, and to learn how your group can meet in Tampa, visit DamagePreventionWeek.com.



Endorsing Organizations:



North American Telecommunications Damage Prevention Council



Minnesota Rural Electric Association



2021 Global Locate Masters

Locate Technicians Invited to Compete in a Tournament that Promises to Test and Celebrate Locate Excellence

• STAFF REPORT •

The Inaugural Global Locate Masters is set to take place during Damage Prevention Week at the 2021 Global Excavation & Safety Conference in Tampa, March 23-25. The competition will test the top locators in the world in a skills competition unlike any held before. Using UTTO virtual locate simulators, locators will have the unprecedented opportunity to showcase their skills in front of one another and the Conference audience.

Locators are typically evaluated by the mistakes they don't make, making it difficult to find recognition for all of the skill it takes to perform the job well. The Global Locate Masters is the opportunity to display the years of experience, critical thinking, and mental agility it takes to complete quality locates in a timely manner. The competition will recognize, reward, and shine a spotlight on the world's best utility locating professionals, all in front of an audience of damage prevention professionals.

Competition Format

The competition will feature UTTO virtual locate simulators, providing a novel opportunity for indoor competition with realistic, variable, and highly customizable locate scenarios. The simulators accurately replicate the unique challenges found in the field and its on-the-fly programmability allows for fair competition with equal standards across competitors. Most exciting, changing locate scenarios allows fellow competitors, conference attendees, and vendors to become spectators.

The Locate Masters will culminate in a grand finale on Wednesday. The finale will feature the highest performing technicians of the competition and will ultimately crown a single winner. Awards ceremony and prize information is available at GlobalLocateMasters.com.

Qualification

To find and crown the best locate technician in the world, the Global Locate Masters offers several qualification methods. Competitors can qualify in one of three ways:

1. **Employer nomination**
2. **Placement at a qualifying regional locate competition**
3. **Onsite qualification at the 2021 Global Excavation Safety Conference**

Additional information on Global Locate Masters qualification is available at GlobalLocateMasters.com.

Conference attendees are encouraged to try UTTO's virtual locate simulation system while onsite to try their hand at difficult locate scenarios.



Global Locate MASTERS

Celebrating Locate Technician Excellence

Unrivaled Learning Opportunities

Masters competitors will gain access to unique opportunities for further learning at the world's largest utility damage prevention conference, including demonstrations of new technology and education on best practices. Additionally, the conference is the perfect place to network and communicate directly with equipment manufacturers, managers, and fellow highly skilled locate technicians. The competition itself, using the abilities of UTTO virtual locate simulators, will further sharpen skills and present new challenges that are difficult to replicate in the field.

The world's best locate technicians work every day to protect the public and the underground utilities we all rely on, and the Global Locate Masters is where they will showcase the immense amount of skill it takes to do the job well. Competitors from around the world, from large companies to small, will be there to compete to call themselves the best. Will you? 

Visit GlobalLocateMasters.com to learn more about participating in the Global Locate Masters, sponsorship opportunities, and the 2021 Global Excavation Safety Conference.



The Roundtable Live!

(September 24th at Planet Underground, Manteno, IL)

PLANET UNDERGROUND was founded on the simple concept that the contractor is not the problem, they are the solution. How can full pictures of the utility installation and damage prevention worlds be realized without input and participation from those who are out in the field every single day performing this essential work? Our signature event, The Roundtable, took the first steps to address this problem. By inviting top members of the excavating world to sit alongside other key industry members to tell their side of the story, we expand the understanding and awareness of these problematic issues.

But we soon realized that while The Roundtable delivered top-notch industry conversation, debate and discussion, it needed a complementary action component to fully show the reality of these concepts. Thus, The Roundtable Live! was born. By inviting top contractors and operators to our facility and having them perform real-time excavations on live underground utilities, Planet Underground laid claim to a first-of-its-kind event: the only industry convention held on an actual jobsite.

Nowhere else can you come to one place and see industry-leading contractors doing such things as: installing utility lines, staging cross-bore demonstrations, pot-holing underground facilities, operating sewer cameras, simulating trench collapses, and more. The crucial, essential work that these contractors perform every single day is on display for attendees to watch and even participate in.

We also invite top equipment manufacturers to the event, and this equipment is used LIVE onsite for attendees to witness. You can speak to the operator who just used a directional drill to perform a tricky 75-yard bore shot under a road and across three live utility lines. You can discuss the advantages of using one of many vacuum excavation trucks with the operator who just made the three potholes along that bore route to ensure no lines were hit along the way. You can pick the brain of a contract locator using the latest locating equipment technology to find and mark those underground lines that the HDD operator is trying to avoid. Every aspect of the underground utility installation process is on display at The Roundtable Live!, and every piece of equipment needed for that process is used by participating contractors.

This communal, mutually-beneficial atmosphere has been critical to the achievements of The Roundtable Live!, allowing us to glean three key tenets from our success, and in the process generate a new tagline for 2020:

PROTECT – EQUIP – BUILD

Protect: It is not just a locator spraying paint. A lot of work goes into keeping a job site free of costly, dangerous underground utility strikes, beginning with a proper utility design.

Equip: Whether open trench or directional drilling, job safety demands that all public and private underground lines must be exposed before excavation begins. Vacuum excavation and associated tools are fast becoming the preferred way to get that job done.



Build: It is not always easy getting a new utility line from point A to point B, but construction equipment manufacturers are making that job easier all the time. Plus, with all the tools to record new line location and elevation, we are making it safer for the next generation. **DP**

To learn more, register for an event or become a sponsor, go to theroundtablelive.com.



Reduce Cross Bores

Cross bores can have serious consequences. The Cross Bore Safety Association (CBSA) has created the Leading Practices for Cross Bore Rick Reduction.

The CBSA will conduct the first ever course on these Leading Practices March 23, 2021. If you are a gas distribution company, a utility contractor, or a sewer system operator this course can help you avoid serious safety problems.

A part of:



Held in conjunction with:



To register or learn more, visit GlobalExcavationSafetyConference.com/CrossBoreSafety

To learn more about CBSA and its initiatives, visit

CrossBoreSafety.org



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- 50 Million Holes in the Ground: Unique Challenges that Fence Contractors Face
- Believe in Safety: Know the Risks of Short Cuts Damage Prevention Patrollers
- Buried Alive: A Survivor's Story
- Colorado's New Design Ticket Success Stories
- Damage Prevention
- Day We Will Remember
- De-Escalation Volatile Situations in the Field
- Distribution Public Awareness Council (DPAC) Natural Gas Distribution Safety Benchmarking
- Education vs. Training
- Excavation Safety: Protecting Workers. Protecting Utilities.
- Implementation of the ASCE "Utility As-Built Standard" in Montana
- Innovations Target Reducing Underground Utility Damage During Construction
- Locating and Mapping Gas and Oil Facility Infrastructure
- Metrically Driven, Continuous Improvement for Stakeholder Engagement and Damage Prevention: The National Grid Case Study
- New Construction Techniques in Fiber Optics
- New York 811: Transforming Damage Prevention in New York City and Long Island
- Online Locate Requests vs Phone Submissions: Why go virtual, and is it safer?
- Paying Attention Could Make All the Difference
- Power of Don't: Communication and Leadership Excellence
- Power of Safety First
- Preventing Electric Utility Damage
- Safe 4 Culture Changer Program: Improve your safety culture through an effective safety campaign
- Safe 4 the Right Reasons
- Two Confined Space Standards. Which one is for you?
- Using the Leading Practices for Cross Bore Risk Reduction
- White Lining Essentials

New sessions added regularly.

Visit GlobalExcavationSafetyConference.com to see new sessions or to sign up for updates.



Proven track record since 2004

- 23,522 attendees
- 1,760 exhibitors
- 1,038 sessions developed
- 20 countries

"I learned a lot from this conference. It was my first time and it was an eye opener, given that I have been in this industry for 20 years."

- Otre Moussa, Otre Engineering P/L

Industry Summits

Industry leaders participate in moderated discussions addressing major industry issues and explore potential solutions for these concerns.

-  Electric Safety Summit
-  Excavator Perspective Summit
-  Fiber Optic Asset Protection Summit
-  Global One Call Summit
-  Pipeline Safety & Awareness Summit
-  Underground Safety Summit
-  Water & Sewer Infrastructure Protection Summit

Workshops*

Immersive full or half-day educational experiences designed to teach practical strategies and gain comprehensive knowledge from recognized industry experts. Register for a workshop to enhance your Full Conference experience, or as a stand-alone event.

- Damage Investigation & Claims Resolution 
- Locator Theory Demystified!
- Safe 4 Culture Changer Program: Improve Your Safety Through an Effective Safety Campaign
- Utility Locating with GPR
- Utility Locator Skills Enhancement 

Refreshments sponsored by

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* Prices vary and pre-registration is required.

While the face-to-face experience is often the first choice for conference attendees, access to education, networking, and exhibitors post-event can truly enhance your experience! Check out the all-new virtual companion event now available! Learn more at GlobalExcavationSafetyConference.com

Special Events

- Tuesday Welcome Reception
- Global Locate Masters
- New Locate & Damage Prevention Technology Forums
- Wednesday Night Networking Event
- Outdoor Demo Fair and Picnic Lunch



We know COVID-19 raises concerns for people regarding social gathering. Visit GlobalExcavationSafetyConference.com to learn what we are doing to ensure your health and safety in light of the current pandemic.

Learn Your Fortune

Cut out and fold the fortune teller below to see what the future holds for you at the 2021 Global Excavation Safety Conference.

Top-Left Quadrant:
 Golf with key clients at the Click Before You Dig Golf Scramble

Top-Right Quadrant:
 Learn about new solutions at the New Locate & Damage Prevention Technology Forum

Bottom-Left Quadrant:
 Make great connections at the Wednesday Night Networking Event

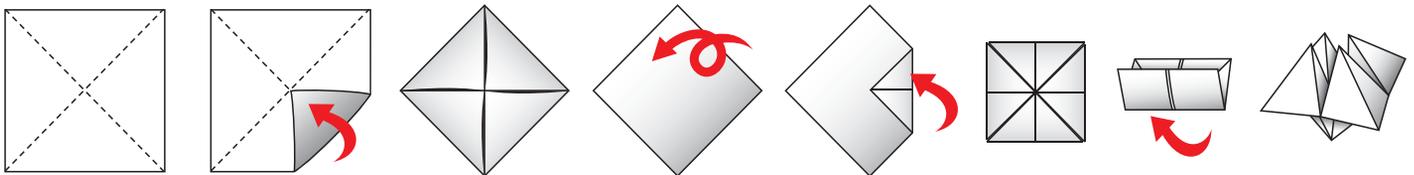
Bottom-Right Quadrant:
 Meet exhibitors and colleagues at the Welcome Reception

Left Side (Vertical Text):
 Choose from over 80 sessions to expand your industry knowledge

Right Side (Vertical Text):
 Get hands-on experience at the Outdoor Demo Fair

Bottom-Left (Vertical Text):
 Join in the discussion at an Industry Summit and hear ideas from industry leaders

Bottom-Right (Vertical Text):
 Attend the Orientation session to find out how to take advantage of all the opportunities at the Global ESC



"This is a place where I can come and get valuable information that I'll be able to bring back to my organization and help me do what I everyday better."

-Matt Miceli, NiSource



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To find out more about this locator or check out any of our other 3M products please visit 3m.com/Dynatel or contact your 3M sales professional.



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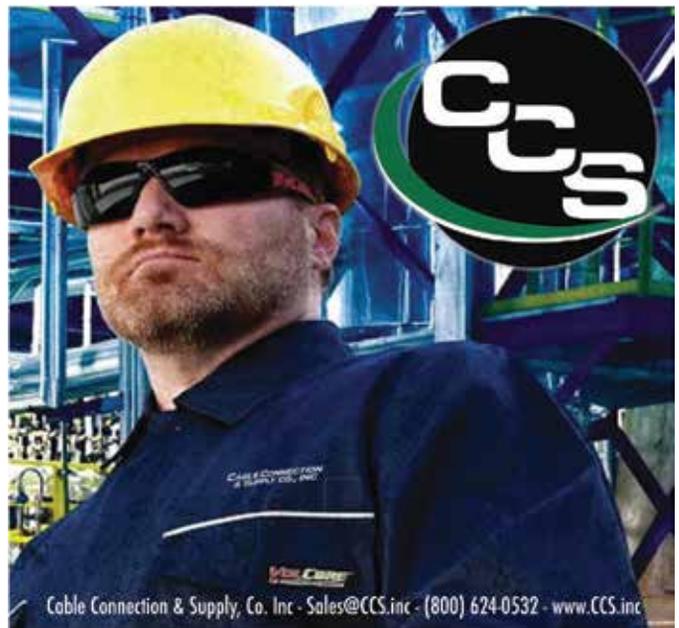
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- Report any Release or Suspicious Activity to Authorities
- Call 811 to Locate Pipelines

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www.constructionangels.us

Construction Angels provides immediate financial assistance and grief counseling to children and spouses when a construction worker suffers a fatality on the job site. Please Support/ Sponsor/Donate to help "One of our Own". Upcoming Events: Golf Classics, October Online Auction, Diamonds & Denim/Auction.



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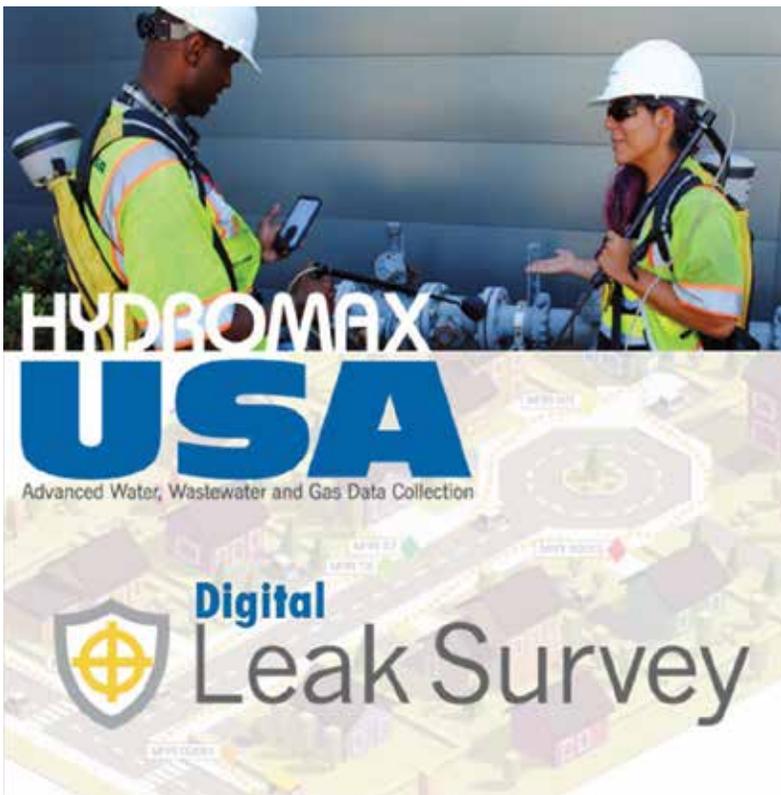
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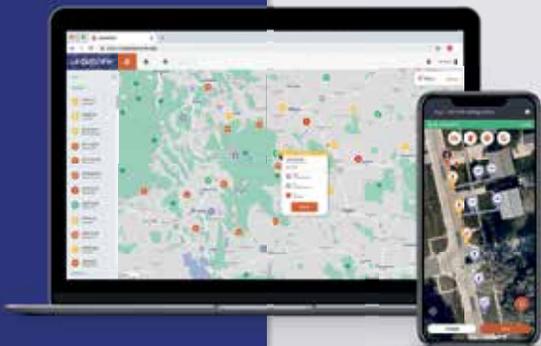
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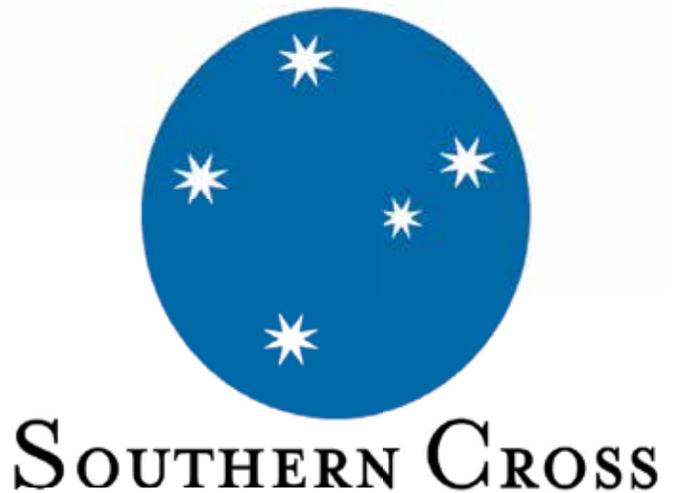
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RADIODETECTION®



Digging holes in the ground is a fundamental part of construction and of the installation and maintenance of buried utilities.

Unfortunately, every time ground is broken there is the risk of damaging buried services. Being able to excavate safely is a fundamental competence for utility companies, their contractors and the construction industry.

Damaging underground utilities can be dangerous: news reports across the world describe serious injury or death to workers and bystanders that can result from striking buried electricity cables or gas pipelines. Damage is also expensive: the utility will have to be repaired, productivity will be reduced, reputations are weakened and compensation paid.

It is vital to call 811 before excavating. It is important to use location tools in conjunction with maps (where available) to verify the marks and scan for buried services that may not have been marked correctly, or at all, but never rely on maps alone.

There are two main approaches to finding buried services with electromagnetic locators: precision locate and avoidance/post-locate. For precision locate, Radiodetection's RD8100 locator series are designed for use by professional utility locators and survey professionals; they offer a much broader choice of modes and frequencies for the precise identification of individual services. Find out more: www.radiodetection.com



Offered on a class 6 chassis, the RAMVAC AX air excavator does not require a CDL to drive or operate. Its single engine design allows operators to excavate with both air and water using one truck. All water systems are contained within a heated enclosure for cold weather application and the hydraulic rear door allowing operators to dump spoils quickly and easily. This truck provides the ability to pothole using a 4" port or perform major excavating using a 6" port, while offering standard payload capacities from 5,000-12,000#. With blower capacities from 18-28" Hg @ 1400-3000 CFM and standard dig deep boom carrying powerful air flow, operators have the ability to dig 10 feet below grade. RAMVAC also offers hydro excavators with 3000-5400 CFM @ 18-28"Hg with debris body capacities from 3-15 cubic yards. The water system includes a 1,300-gallon water tank, 10gpm @ 2500psi water pump located inside a heated enclosure. Other great features include a long range wireless remote, directional discharge system with reversible blower, NEMA 4 electrical system, 400,000-800,000 BTU water heater, 3-stage cyclonic filtration system, vacuum enhancer, hydrostatic blower drives and 10-micron final filter. With new, rental, rent-to-own and preowned units, and nationwide service locations and a parts/accessories online store, RAMVAC has the solution for your vacuum excavation needs.



RAMVAC offers air and hydro excavators with vacuum power from 1400-5400 CFM @ 18-28" Hg and debris body capacities from 2-15 cubic yards. Non-CDL options are available, as well as rental, rent-to-own and preowned units. With nationwide service locations and a parts/accessories online store, RAMVAC has the solution for your vacuum excavation needs.

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The ULTRA-TRAC® APL locates pipe through acoustic impedance mismatch. The speed of sound through ground materials differs from pipe material. This makes the pipe detectable using the ULTRA-TRAC® APL. The acoustic wave pattern of specific timing and frequency is monitored and processed using the device's accelerometers. Based on the return signature the instrument will determine if a pipe is present within the minimum requirements as set in the software.

APL Benefits:

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ULTRA-TRAC® APL will significantly reduce the number of unlocatable pipes and identify potential cross bore risk locations when using HDD technologies. For more information, call 888.473.6748 or visit SENSIT Technologies website www.gasleaksensors.com



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How to Maintain Locators

Electromagnetic locator equipment is the primary tool utilities and contractors use to locate buried utilities to mark them to avoid damage during contracting involving excavation or other soil engaging work. To make accurate buried utility locating equipment must be in good condition and must be operated correctly.

Today's equipment locators are precision instruments and while they are in rugged cases to protect from damage, it can still occur. The focus of this article is how to maintain locators to keep them in optimum operating condition.

Preventing Damage

Careful handling helps prevent damage. No responsible technician carelessly tosses a locator in the back of a truck, but accidental bumps and drops do happen. Any time possible damage is suspected, a quick and easy but informal test is to locate a known buried utility line.

Never make locates with equipment if there is a doubt that it is not operating properly. A faulty locate can result in a utility strike that at the least interrupts vital services, shuts down construction, and can result in costly damages and serious injuries. A rupture gas line can cause a major disaster. If there is any doubt, equipment should be removed from service and taken to an authorized service center.

Some products may require periodic checks and certification they are working properly. A consideration when evaluating equipment to purchase is availability and timeliness of service.

Getting Wet

Most locating equipment is water resistant and designed to work in all weather conditions. After working in rain, never pack equipment wet as moisture can be sucked into the instrument due to temperature changes. If water condenses on sensitive electronic components, it can cause damage.

Always wipe down wet equipment with a cloth and allow it to naturally air dry with any covers or compartments open and ideally put in a warm and dry environment overnight before the next use.

Damaged Batteries

Damaged or sub-quality batteries can leak inside equipment and their chemicals result in permanent and costly damage to the instrument. Never leave damaged or leaking batteries in the instrument, remove them immediately and dispose of them in accordance with specified requirements. Carefully clean off any chemical residue.

Shared Equipment

Some organizations have equipment pools from which different users check out needed equipment. In such cases, users must be aware of potential damage caused by other users that was not reported or repaired. Any user that identifies equipment damage should report it to a supervisor, manager, other co-worker or arrange to get it repaired. Never give damaged equipment for others to use.

It makes sense when using unfamiliar equipment to have a simple checklist before using it on a job site.

- Check the battery condition visually and with the electronic battery status indication. If batteries don't test good, or their condition can't be verified, replace the batteries.
- Visually inspect the equipment for any obvious damage or other sign that it might be faulty. If possible carry out a quick check on a known buried utility line before using the equipment.

Always remember that locating equipment is an essential tool for the safe and effective locating of underground utility lines. Failure of the equipment or failure to use the equipment correctly poses the risk that buried lines will not be located and properly marked and that this can result in damages that cost the contractor and owner time and money and risk the safety of construction personnel and the public.

Self-Test Tips

Transmitters of most utility locator system have an induction or broadcast mode that is a simple and effective operational check.

Turn on the transmitter and select induction or broadcast mode or frequency. Set the locator receiver to the same frequency mode and from a distance about 10 feet, point it toward the transmitter. Adjust the locator sensitivity as required to get a strong indication. The locator should respond strongly to the transmitter signal. Move closer toward the transmitter, and the indication should increase. Move away, and it should decrease.

An additional test is to connect the transmitter connection leads and join their clips to create a direct short circuit connection. Set the transmitter to one of its out-signal modes and at the lowest output signal level or power setting. Set the locator receiver to the same operating mode frequency. Place the bottom of the locator in one of the transmitter leads and adjust sensitivity as required to get a strong indication.

The locator should respond strongly to the transmitter signal. Move the locator away from the lead and the indication will reduce. If there is any doubt about results of either of these tests, it is possible that either the transmitter or receiver could be damaged and should be sent to a registered service center for full testing and repair if needed.

Learn more at subsite.com.

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Record #51

Date: 07/01/2020
Time: 09:23 AM (GMT-0700)
Frequency (MHz): 8.182 MHz
Locate Current Direction: unknown
Locate Current: 13 mA
Depth: 8 ft 4.23 in
Latitude: 37.3792164
Longitude: -121.9674179

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The vLoc3 RTK-Pro receiver is the first to add RTK GNSS accuracy to a utility locator. Using the RTK-Pro internal cellular module with 4G LTE capabilities, the operator can connect to NTRIP RTK (Real-Time Kinematic) caster that provides RTCM 3 corrections. By utilizing these corrections, the operator can collect both utility location data along with the geographical location of the utility with survey-grade accuracy.

The RTK-Pro is designed for all operator levels, utilizing user-friendly and intuitive locate screens. Operators confirm the utility data with the press of a button and align the electronic spirit level to store the data. All field data is sent to the cloud and retained in the receiver's onboard storage for review and exporting to external mapping programs.

The user-configurable vLoc3 series receivers contain eight passive locate modes, fault-find mode, and a range of configurable frequencies from 16Hz to 200 kHz. Visual and mechanical vibration alerts can also be configured by the user providing warnings for shallow depth, overload, overhead cables, and excessive swinging. Optional features include Tx-Link that enables the user to change the frequencies of the transmitter, power output and operate most of the features of the transmitter remotely.



No Call-In Damages

Using AI to Reduce Damages

LOCATION: SOUTHWEST UNITED STATES

CLIENT: GAS UTILITY

URBINT LENS: DAMAGE PREVENTION



Win #1

Urbint found that 83% of excavation permits did not have an 811 ticket.



Win #2

Built a list of the top ten no call offenders, accounting for 68.7% of all no call-ins.



Win #3

Urbint found that excavators who do not submit an 811 ticket are 88% more likely to cause damages.

About the Company

A gas utility that serves over 4 million natural gas customers across utilities in four states. This case study focuses on a subsidiary, located in the Southwest United States.

Goals

Reduce the number of pipeline damages by identifying dig sites that do not have a corresponding 811 ticket by leveraging artificial intelligence and municipal permits.

The Problem

Despite requirements to submit an 811 ticket before a dig to notify utilities of possible threats to their infrastructure, excavators, and homeowners do not always submit an 811 ticket before they dig. To raise awareness in an effort to decrease risks and damages, utility operators run Dig Awareness campaigns to educate and remind the public to call 811 before a dig. Unfortunately, these campaigns are broad and not always effective.

The Solution

Using advanced text matching techniques, Urbint's NCI tool downloaded municipal building permits and scanned for permits indicative of an excavation.

Our proprietary AI then cross-referenced municipal permits with 811 tickets, revealing which excavators did not submit an 811 ticket. To further assist with no call-in excavation reduction, Urbint leveraged permit data to identify permits not linked to an excavation ticket. Using natural language processing, Urbint was also able to identify habitual no call-in offenders.

The Results

Urbint was able to identify 990 municipal permits with a definitive excavation between January 1 and July 31, 2019. Of those 990 tickets, 824 of them did not have a corresponding 811 ticket – or 83.2%. Working off of this data, Urbint built a list of the top five no call-in offenders, who were responsible for 68.7% of no call-ins. Of those top five offenders, the number one offender was accountable for 33.6% of all no call-ins.

Breaking the data down even further, Urbint identified the top ten zip-codes where homeowners cause no call in damages. Two of the top ten zip-codes single-handedly accounted for 43% of all damages caused by homeowners.

Overall, Urbint found that 20% of no call damages could be traced back to an identifiable building permit. Additionally, no call damages occur at a rate of 4.54 per 1,000 digs – 88% higher than the damage rate associated with 811 tickets.

The Recommended Actions

Using the data compiled by Urbint, we suggested targeting the list of top offenders and the top ten zip-codes where homeowners cause no call in damages with Dig Awareness campaigns. By allocating resources and time on these offenders, the utility is now more effectively educating the worst offenders to reduce damages.

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DAMAGE PREVENTION... THE CHICAGO WAY

BY JAI KALAYIL AND MATTHEW PETERSON

The city of Chicago is a tremendous place. Founded in 1833, the “Windy City” has always been a town that leans into challenges. When a growing country needed food, Chicago built the stockyards and railyards; when a fire decimated the metropolis, Chicago invented the skyscraper to hasten redevelopment; and as the population grew, Chicago built the “el” to move people across the city efficiently. With each advancement came infrastructure. As it became more crowded underground, so did the risk that utility damage would have severe consequences. Despite the risk, it wasn’t until 1992 that civic leaders and utility stakeholders codified a plan to prevent infrastructure damage.

On April 13, 1992, the Chicago Loop flooded. The event, known as the Great Chicago Flood, was caused by sheet pilings being driven into a “freight tunnel” beneath the Chicago River. The flood resulted in nearly \$2 billion in damages and forced people to ask the question, “How could this accident have been prevented?” Just like Chicago’s answer to its previous adversity, the answer was innovation. Chicago established the Office of Underground Coordination (OUC) with a mandate “to promote efficiency of work in the public way, to reduce the risk of damage to existing underground facilities, and to reduce the inconvenience to the public caused by work in the public way.” OUC would become the first and most vital step in Chicago’s damage prevention life cycle.

OUC is part of the Chicago Department of Transportation’s (CDOT) Division of Infrastructure Management (DIM). DIM is responsible for overseeing any project on or under the public right-of-way within the city of Chicago. With the establishment of OUC, DIM implemented an oversight life cycle that includes reviewing and approving project plans, issuing work permits and dig tickets, and enforcing compliance with CDOT regulations. The life cycle begins when a developer requests information about facilities at a site. This process, known as Information Retrieval (IR), provides the developer with atlas pages allowing them to design a project in a manner that minimizes interference with existing facilities. Once the project design is complete, the developer submits their drawing to OUC for Existing Facility Protection (EFP) review. OUC staff scrutinizes the drawing to ensure it complies with applicable regulations and is coordinated with other pending projects. If OUC approves, it distributes the drawing to utility owners (including gas, electric, and water) for review. If a utility owner determines that the proposed excavation and installation encroaches upon existing infrastructure, they ask the developer for revisions. OUC approves the plan only after the design is clear of all existing utilities. In this way, DIM reduces the likelihood of damage before excavation begins.

Once OUC approves the project, the developer’s contractor contacts DIM’s Permit Office and requests a work permit. Only licensed contractors with approved OUC files can request work permits. Permit Office staff reviews comments from OUC review and considers those comments when issuing a work permit to the licensed contractor. To promote transparency and alert community members to impending work, DIM posts all permits online.

After the Permit Office issues the work permit, the contractor can request a dig ticket by calling 811. Chicago is unique in that CDOT operates the city’s One Call center (the rest of Illinois is under the jurisdiction of JULIE, the state One Call center). The upshot of having the One Call center affiliated with CDOT is that staff, technology, and laws are aligned to close control gaps. For example, the 811 system will not allow staff to issue a public right-of-way dig ticket without a valid permit.

The final step in the damage prevention life cycle is enforcement. DIM has two dedicated inspection units: Public Way inspections focus on permitted work and general right-of-way issues, and 811 inspections focus on utility damages (of which they investigate every reported damage) and One Call violations. 811 enforcement and mandatory damage reporting were established by law in 2017 to create the final component of the damage prevention life cycle. Both inspections units have the authority to issue citations. Citations issued by Public Way inspectors are prosecuted by the City of Chicago’s Administrative Hearings division; citations issued by 811 inspectors are reviewed by a panel consisting of City and utility representatives. DIM uses inspection data, including citations, to identify irresponsible contractors and, if necessary, deny them permits in the future.

DIM’s damage prevention life cycle is effective for three reasons.

1. All workflows in the life cycle are under the purview of one agency. This allows for

standardized rules and encourages collaboration. If operations were scattered, different work units may be subject to conflicting priorities that would undermine the workflow.

2. **DIM relies on technology to control its processes. Beginning with OUC, integrated data systems provide reasonable assurance that only approved projects (those designed to avoid damage) can move to the next stage and, eventually, excavation. In addition, most of DIM’s data systems have a public facing view (ChiStreetWork, permits, dig tickets) which adds an additional layer of oversight.**
3. **Public Way stakeholders participate in the damage prevention life cycle. Though OUC membership is not required by law, all major utility owners in the Chicago area participate in IR and EFP reviews because it helps protect their assets. Similarly, utility owners and excavators voluntarily send crews to 811 Chicago for training.**

The effectiveness of DIM’s damage prevention life cycle can be observed by measuring utility hit data within the context of Chicago’s construction environment. Starting in 2014, Chicago has experienced a boom in high-rise construction, including several towers greater than 70 stories. In addition, major public works projects have begun like reconstruction of “el” lines (Red Purple Modernization project), installation of Bus Rapid Transit (BRT) lanes, construction of the Obama Presidential Center, and rebuilding of the “Circle Interchange.” To support those projects and continually meet the needs of the public, utility owners are replacing water mains (880 miles so far) and natural gas lines (eventually 2,200 miles will be replaced), installing 5G modules, and repaving roads. Yet, despite the increase in excavation activity and an already crowded subsurface, utility hits have decreased. Since 2017, 811 Chicago experienced a decrease in utility damages, highlighted by a 0.62 damage ratio in 2019.

DIM and its Public Way stakeholders continue to identify ways to bring the City of Chicago closer to “zero damages.” Interactive training, machine learning, and predictive analytics hold promise for preventing, rather than reacting, to utility hits. DIM staff embrace the spirit of Chicago by finding innovative ways to solve today’s most difficult challenges in an effort to achieve the goal of “zero damages.” 

Jai Kalayil and Matthew Peterson, Chicago Department of Transportation, Division of Infrastructure Management. They can be reached at jai.kalayil@cityofchicago.org and matthew.peterson1@cityofchicago.org.



PATROLLER PROGRAM DRIVES IMPROVED DAMAGE PREVENTION

BY DANIEL FITZPATRICK



Photos courtesy of Orange and Rockland Utilities, Inc.

I am sure many readers have been tasked with reducing damages, but why is that so important? Damage to underground facilities by excavators is a safety issue for utility companies. Utility companies use several strategies aimed at reducing and, ultimately eliminating, damages.

With a greater focus on proactive damage prevention, a patroller program is an emerging strategy focused on cultivating a working relationship between the utility and the excavator to prevent damages. This collaboration aims to create clearer communication, greater mutual understanding, fewer delays and, most importantly, a safer workplace.

A patroller program deploys roving excavation inspectors who have been trained in safe digging excavation techniques, regulatory laws, and utility company policies. Patrollers focus on damage prevention issues; they are not construction inspectors.

Patrollers work with, and guide, the excavator's work while they are digging near underground facilities. Patrollers will correct mistakes through issuing violations so they can be identified and targeted in communications. Reducing these violations is the key to preventing damages.

What makes a good patroller program and how can you utilize it to reduce damages?

Hiring the Right People

Patrollers are your direct contact to influence behavioral changes. They are face-to-face, seeing why the excavators work the way they do.

When you hire a patroller, a great attribute to look for is a security background. This job is not always easy; it is easier to teach the technical aspects of the job than to teach the skill-set to stand your ground while maintaining a productive dialogue. Once the patroller and the excavator establish trust, a relationship begins.

Data

If you do not capture site visit information, then you are not doing the patroller program justice.



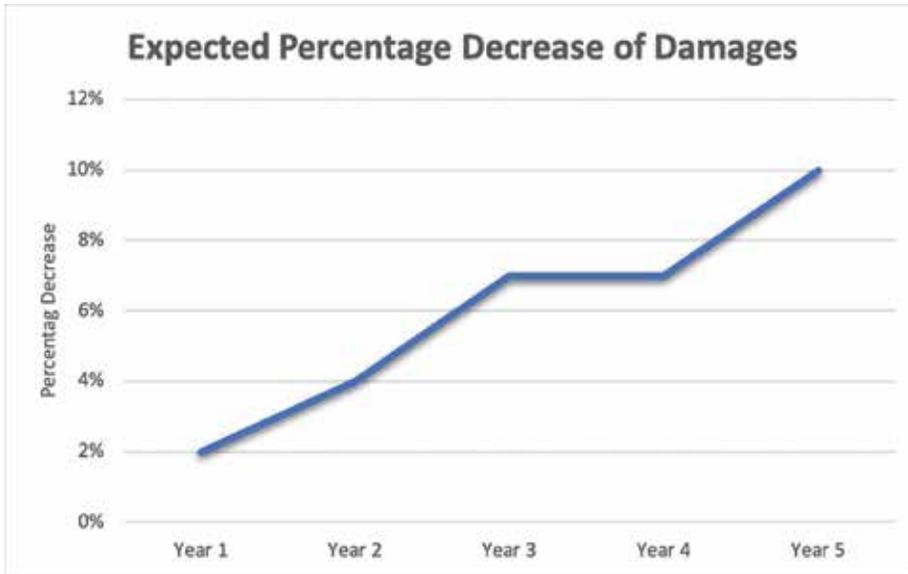
Analyzing the right data allows you to focus on the jobs that have the greatest risk. The data will allow you to fine-tune the program and steer it in the right direction. The obvious data elements to capture are:

- **Location**
- **Type of work**
- **Contractor type**
- **Work status**
- **Pictures/Videos**

Other key data elements to capture include:

- **OPERATOR** - Studying this worker's methods could show if there is a problem with a spe-

Typical expected damage reduction due to a patroller program. It will take time to gain trust and change behavior, but over time you can expect a significant reduction in damages.



It is important to invest in a solid program to store and analyze the data you collect. The data is more valuable if it is well-organized and easy to use. It is even better if it communicates with your ticket management system.

Communication

Even if you have other outreach programs, the patrollers are the ones who will be most successful in affecting change. Patrollers are the key to clearly communicating your message. Make sure that they are consistent in their messaging. Gear them up with the latest industry knowledge, get them involved and encourage them to get the excavator involved in industry movements.

Changing behavior is not easy. However, the more you engage the excavator and continue communication, you will find that the behavior change will follow. Running an effective patroller program will show you why damage prevention is truly a shared responsibility. **DP**

Dan FitzPatrick is a scheduled speaker at the 2021 Global Excavation Safety Conference.

Dan FitzPatrick is a Damage Prevention Field Operations Planner for Orange and Rockland Industries, Inc. Dan serves on several local and national damage prevention committees, including the Board of Directors for Dig-Safely NY. He can be reached at fitzpatrickda@oru.com.

sific equipment operator rather than the excavator's overall operation.

- **WEATHER** - This seems arbitrary, but it can show you if there is a work pattern with weather (e.g. rushing when it gets cloudy or hot).
- **TIME** - One excavator may be rushing and taking risks before lunch or another might be operating with a reduced staff in the morning and overwhelming the laborers. Knowing this allows a patroller to visit the site at the best time.
- **JOB SITE RATINGS** - Assigning a value to the site visit makes it easier to tackle larger problems before smaller ones.

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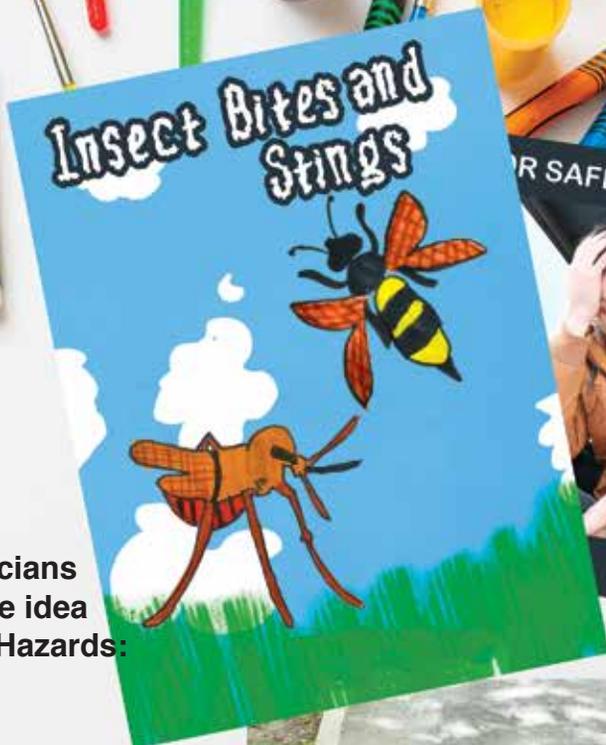
The video is accessible at vimeo.com/114175332, on YouTube or at the Pipeline Association's website: www.pipelineawareness.org



Submit Your Art!



Submit artwork for Locator Safety Awareness Week's new poster, and be featured in dp-PRO!



All topics relating to locate technicians are accepted and encouraged. One idea is to focus on the Top 10 Locator Hazards:

- Confined Space
- Threats to the Eye
- Climate & Weather
- Dog Bites
- Punctures & Foot Trauma
- Poison Ivy & Other Skin Threats
- Insect Bites and Stings
- Walking, Lifting, Bending and Squatting
- Slips, Trips & Falls
- Time on the Road.



Submit your artwork at LocatorSafety.com by October 15, 2020

Artwork can be drawn, computer generated, or photography based. Creativity is heavily considered in the selection process, so have fun with it!

The LSAW Artwork Contest is open to all artists. Submissions must be an entirely original work of art by the submitter.



Water Infrastructure and Damage Prevention: A Global Perspective

• BY MUNYARADZI TICHAONA •

NATURAL AND MANMADE bodies of water play a premier role in the equitable balance of human/animal/plant earthly life. Global warming has contributed to glacier melt, flooding and erosion thereby raising sea levels. Earth's water bodies are being polluted with discarded plastic material, chemical and sewer wastewater, and inappropriate agricultural land-use management.

Damage to natural wetlands leads to uncontrolled runoff coupled with siltation. Humans, ever striving for their comfort and well-being, practice poor garbage disposal, create dumpsites with toxic and/or radioactive materials resulting in carcinogenic formation of leachate, and non-bio degradable plastics. This plastic material is estimated to have a life span of 50-400 years. And the crown jewel of this planetary poisoning is the floating island of trash in the South Pacific Ocean. The Gulf of Mexico has not escaped its share of harm, suffering from illicit mining activities with its discharge of poisonous chemicals and the 2011 oil spill that deeply threatens aquatic life in that body of water.

The unabated use of fossil fuels and the thermal power plants with uncontrolled emissions continue to increase atmospheric temperature contributing to global warming. The catastrophic potential of nuclear plants used for electrical power generation have already had devastating effects (such as Ukraine's Chernobyl in 1986 and Japan's Fukushima in 2011) on oceanic water bodies. These events raised radiation levels in a surrounding 300-kilometer radius and created an ecological desert with a water infrastructure permanently damaged. On the same note, underground transportation of materials by plastic or copper pipes such as slurry, water (hot or cold), sewer, gas and liquid petroleum seabed (marine pipes) have decongested the ground surface. The leakage of poisonous materials is common despite safeguarding mechanisms during repair. Torrential downpour to sub-terrain of carcinogenic volatile organic compounds such as benzene causes dissolution and equilibrium due to percolation to the aquifers, a big threat to life depending on open source. Periodic maintenance is vital to minimize damage.

The run-off of cyanide from the gold separation process and the frivolous pursuit of elephant tusks (ivory) through poisoning of water ponds in the Zimbabwe Hwange National Park have caused death to at least 185 elephants and other carnivorous animals, right down to the small vultures. Suffocation is affecting the entire ecosystem.

And last, but not least, is the impact of excavation and creation of impermeable surfaces due to population growth and urbanization, which have an important bearing on the water infrastructure in both manmade and natural water bodies.

Damage Prevention

The surface and underground water infrastructure could be protected by various methods:

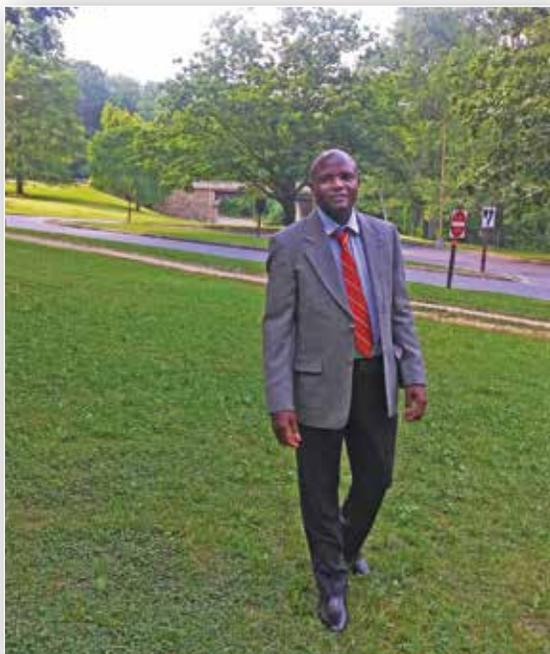
- **CONTROLLED SOIL EROSION.** This is best practiced by the preservation of wetlands, stream bank cultivation or construction, protection of natural forests, and appropriate agricultural practices.
- **DIMINISHED POLLUTION.** The desire for energy and movement of goods is the daily life of human beings. Humans need to raise their individual and collective consciousness and be responsible for emission control; plastic and industrial waste discharge

into the oceans must be controlled at its source. More advocacy needs to be undertaken to reduce the amount of plastic discharge while promoting its reuse and to recycle non-biodegradable material. The use of renewable energy for electrical generation has to become the "go-to" choice for production of food and energy in order to have a positive long-term effect on human life. Currently, nuclear power plants provide 33% of electrical energy, but the cost and potential negative consequences are huge at the moment of decommissioning them or in cases of disaster. The daily monitoring of the permanent threat of oil-spill incidents is paramount. High priority for cleaning the oceans after spills is of the utmost urgency. The commercial use of plastics should be replaced with degradable, chemical-free materials. Poisonous

chemicals need to be more strictly monitored at the distribution point to prevent the loss of life.

These propositions and recommendations can have an impact if worldwide environmental agencies could concur and embed them into our cultures. Cleaning the oceans will create a healthier and cleaner environment. **DP**

Munyaradzi Tichaona is a Civil and Environmental Engineer of Rosewood Contracting International LLC. He can be reached at mtichaona75@gmail.com.



The Quest for One Call's Holy Grail: A Standardized Ticket

• BY SHER KIRK •

“THEY HAVE TRIED FOR 25 YEARS. IT CAN'T BE DONE.”

I heard that in 2016 when I asked why One Call business rules are not aligned to produce a common ticket format. Later that same year, we decided to prove them wrong. British Columbia, Alberta, Saskatchewan and Manitoba set out to align the business rules of the western Canadian provinces and to have the task completed in eight months. Challenge accepted.

Why Standardize Ticket Formats?

Our first step was to identify what made the grail worthy of the struggle. A standard ticket format is not just convenient for excavators; it is a major step towards an automated, safer and more efficient future for the One Call process. Consistent business rules and standardization offer specific benefits:

- Consistent and reliable placement of information strengthens damage prevention by decreasing the chance of critical information being overlooked in “Comments or Additional Information.”
- Infrastructure owners and locators can optimize parsing rules and procedures across their entire operation.
- Software providers can roadmap products based on known inputs and outputs, decreasing delays and costs associated with development and support.
- One Call centers could more easily provide mutual aid and disaster recovery support across jurisdictions.
- Standardized industry reporting increases data quality (for example, in DIRT).

Where to Begin?

It is critical to put the right knights at your round table. The committee must be of sufficient size to be representative of stakeholder groups, but small enough to move nimbly and decisively. Committee members have to be influencers in their stakeholder group. Moreover, the individuals around the table must possess these qualities:

- Understand the reasons why certain business rules exist (historical context)
- Understand why those reasons may not be valid today
- Vision that allows them to see past roadblocks to a clear path forward
- Desire to participate in lively, knowledgeable debate with other experts while understanding that victory is consensus - not winning the argument

What are we looking for?

You must recognize the grail when you see it, so define objectives clearly. Once you agree to the benefits of a single ticket format, measure every decision against those benefits. Create the ideal ticket without concern for how the software will work. Choose to drive the technology development

rather than accept the way it always has been done. Most software providers prefer users who can provide them with a clear roadmap to the target. Determine information that is critical versus “nice to have.” Primarily,



One Call centers provide infrastructure owners with information that clearly defines the what (type of work), where (exact scope of the dig site), when (project timeframe) and who (contact information). Everything else becomes “nice to have.”

Determine the most effective way to capture the where. Analysis done in Alberta and Ontario shows that user-provided drawings reduce damages. Who knows better where they are digging? Getting precise location maps to the members is critical to safety and to expediting responses. Western Canada chose to make a GML file mandatory on outbound tickets so every member can pull that shape file into their own system for screening.

Journey's End

A worthy quest includes dark paths and challenges. There may be knights who say “nay” and strange bridge sentries along the way. You will find, however, that possessing the grail is the key to unlocking new potential. The standardized ticket is the first step in the much longer journey to efficiency, cost-effectiveness and reduced damages. Meet the challenges in the name of the greater good and continue to move forward to success. **DP**

Sher Kirk is Operations Director at Alberta One-Call Corporation, Chair of the Canadian One Call Centres Committee and a board member of the Canadian Common Ground Alliance. She can be reached at slkirk@albertaonecall.com.

LOCATING



BY CHRISTOPHER KOCH

It's not a CONTEST

For several years in the early 2000s I had the pleasure of volunteering with the International Locate Rodeo. It was always very gratifying to see locate technicians from all over the country come together to compete with one another in celebration of what is an often under-appreciated trade.

Reflecting the environment of real world locating, the Locate Rodeo emphasized safety while challenging competitors to locate as accurately as possible under the pressure of a ticking clock. While it was fun to be a spectator at the event, it could be a nerve-wracking crucible to even the most experienced of competitors.

As much as the rodeo attempted to mimic real-world locating though, the facilities were always able to be located by electromagnetic induction within the time allowed, and the only penalty for getting it wrong was wounded pride.

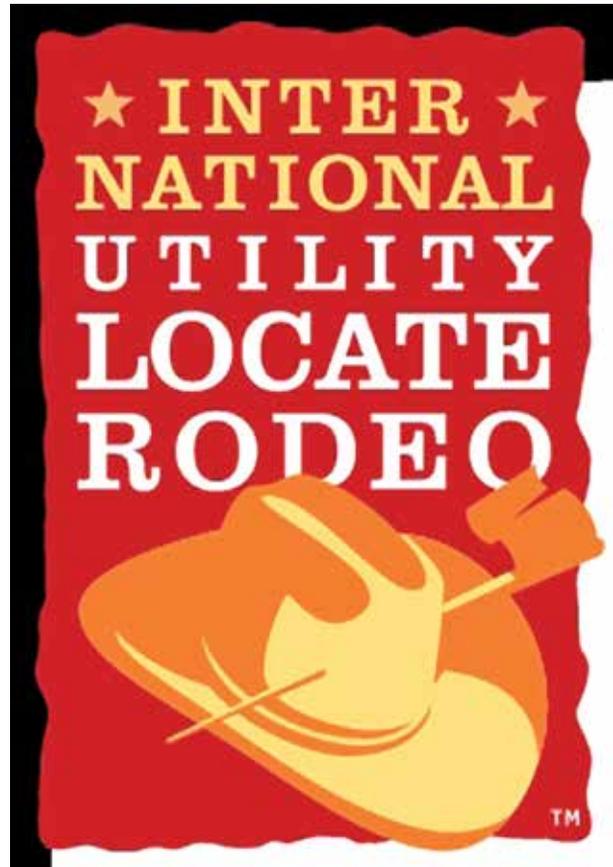
The real world is not so orderly. Many, many facilities resist accurate detection through electromagnetic induction for a whole host of reasons from obvious to obscure, and the penalty for a failed locate can be immense. Never mind the background noise of the ever-present clock, ticking away the seconds to failure.

It is in these moments of real-world stress that I would offer locating technicians the following words of comfort, "it's not a contest." There are no winners and losers, and you can stop the clock whenever you want.

"The pressure and anxiety a technician sometimes can feel on a job site comes from forgetting that there might not be a right answer."

The pressure and anxiety a technician sometimes can feel on a job site comes from forgetting that there may not be a right answer. The utility they are trying to find may not be able to be located by electromagnetic induction within the allocated time. Sometimes the game is rigged, and to realize that gives a technician the power to forfeit with their pride intact.

The key for locating technicians is to remember that they are not actually in the locating business; they are in the damage prevention



business. And sometimes preventing damages means throwing in the towel on a locate. Electromagnetic induction may not be the right tool for the job. The excavation may not be able to commence when the digger wants. An alternate plan may need to be made.

Damage prevention sometimes means recognizing the limits of what is possible. That is okay. It's not a contest. **DP**

Christopher Koch is a training consultant and President of ZoneOne Locating. He is past president of Nulca and worked on both the 2009 and 2015 revisions to the Nulca Professional Competency Standard. He can be reached by email at Christopherkoch@live.com or on Twitter @kochaauthor.

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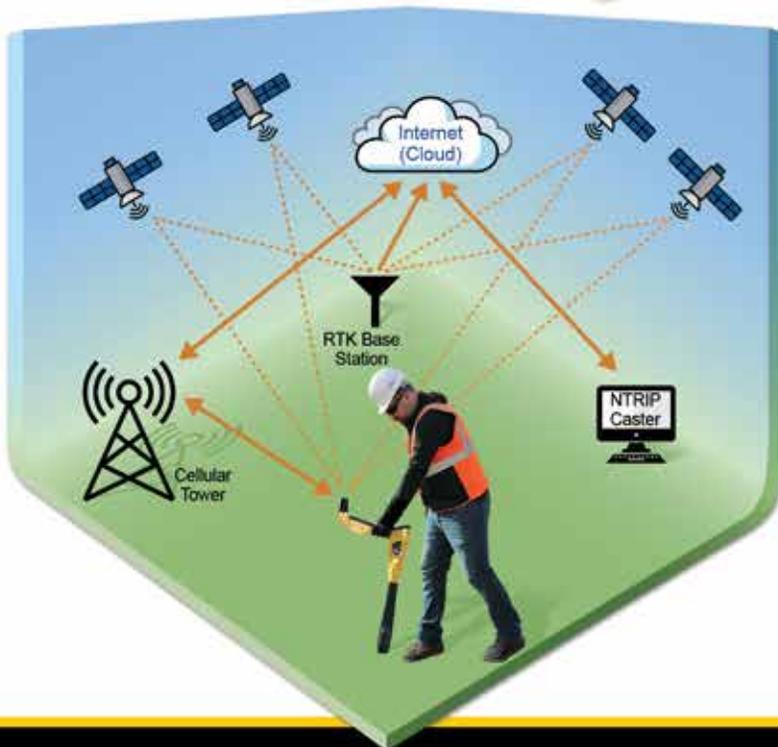
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